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STEEL

The Magazine of Metalworking and Metalproducing

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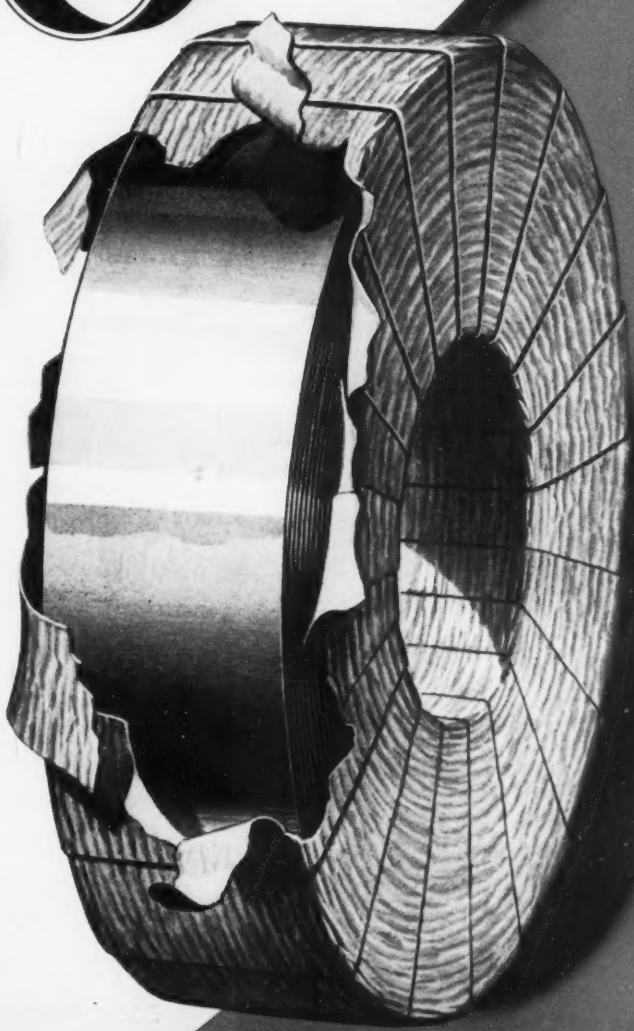

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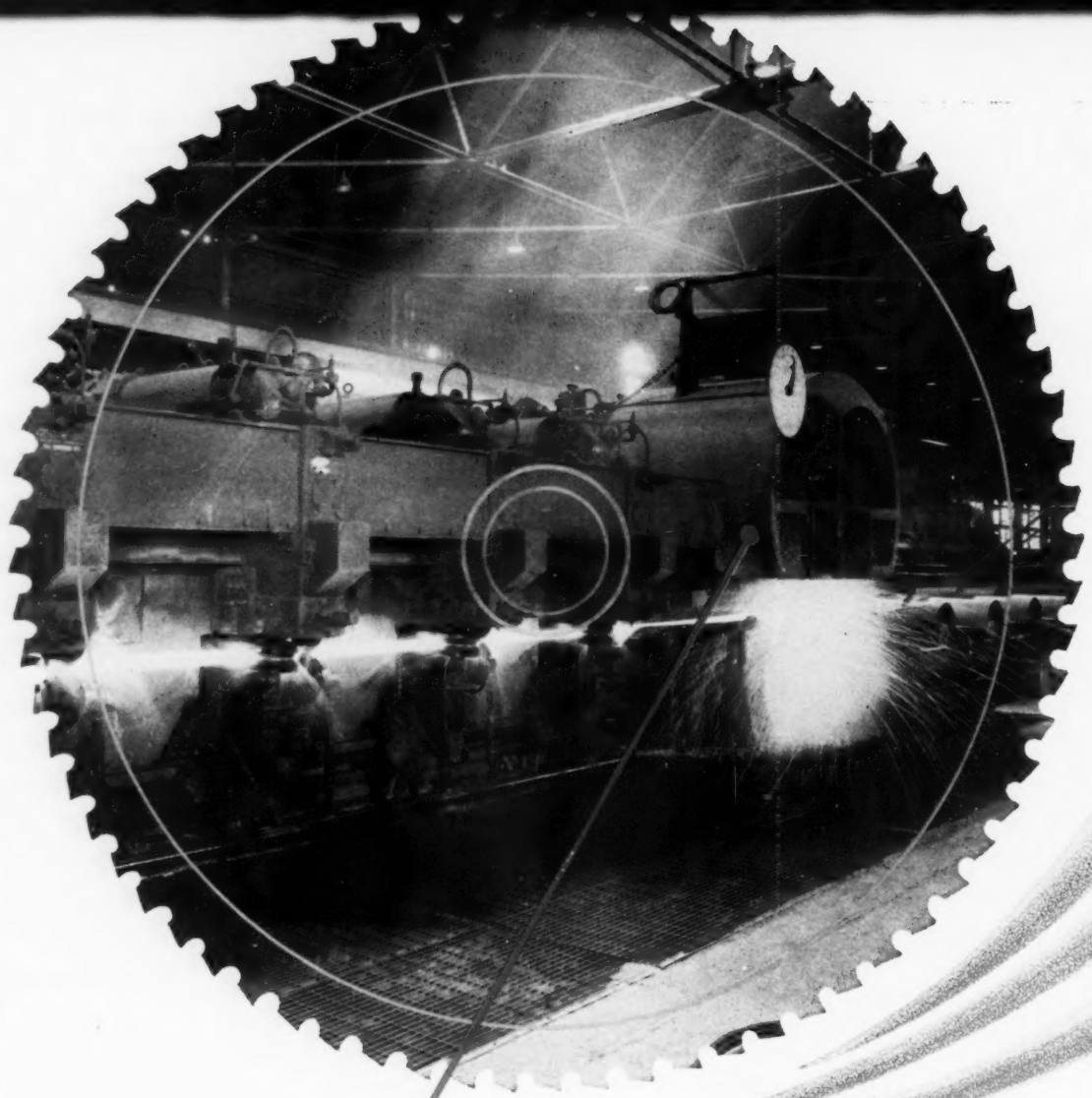

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STEEL

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★ Denotes Regular Features.

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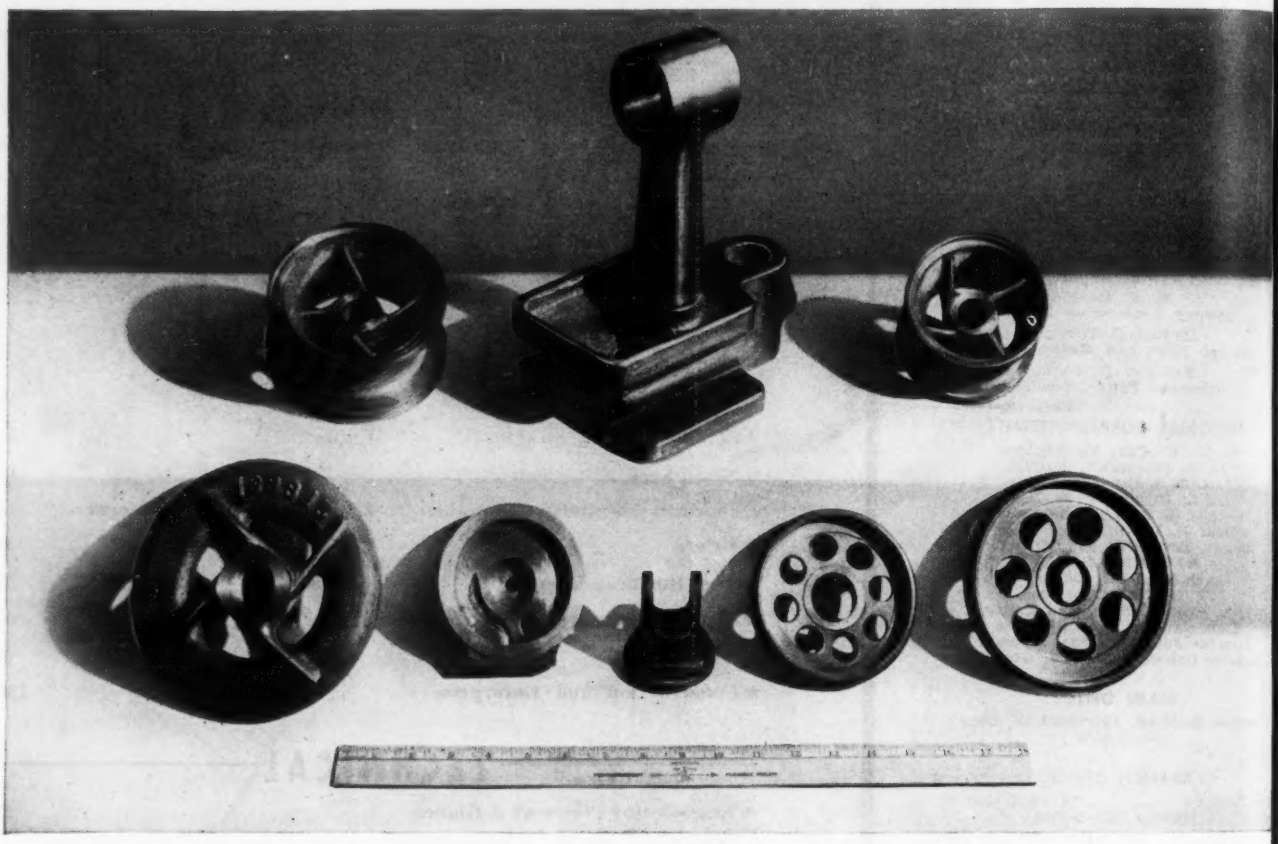

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August 22, 1949

Travesty

Any fair-minded person who attempts to digest the great mass of fact and argument being presented by the steel companies to President Truman's fact-finding board will be forced to conclude that this wholesale hearing of so many individual company cases is nothing short of a travesty on justice. By no stretch of the imagination can it be called a substitute for the collective bargaining that was legalized by the original Wagner act and subsequently by the Taft-Hartley act.

At the New York hearings, one witnesses 63 companies trying in the short time allotted to explain to three men the intricate details of their individual labor relations problems. Even the most casual inspection of the testimony shows that the conditions confronting each company differ from those of other companies.

Before this fact-finding board had set up shop, some steel companies had made good progress toward reaching agreements with their unions. Some companies were more liberal than were others. Negotiations between company and union at or near the point of employment can take into account local and other conditions peculiar to the case at hand.

In the New York hearings, all of the real progress made in true collective bargaining has been scrapped. The special conditions that obtain in Pueblo, Colo., Kokomo, Ind., or Dunkirk, N. Y., all are lost in the shuffle in this mass weighing of evidence. Instead of bargaining on the basis of give and take between the company and its own union, we have a sort of collective trial wherein 63 companies with varied interests are arrayed against a single over-all union demanding a blanket package of benefits.

More important than the immediate result of this fantastic collective trial is the problem of restoring the principle and practice of true collective bargaining on an individual company basis. It should be possible for the management and the union employees of any steel company to work out over the conference table agreements as to wages and other matters which fit their particular situation. They should not be compelled to scrap the fruits of their collective bargaining to date and to accept a substitute dished out from a collective trial in the familiar Russian fashion.

* * *

UNCERTAINTY IS COSTLY: Incidence of a major strike threat following on the heels of an abrupt shift from a seller's to a buyer's market has played havoc with the plans of almost everybody in the metalworking industries. To adjust plans to a lower level of operations is difficult enough; to do it under the uncertainty of whether there will be or will not be a major strike is almost impossible.

Consider the situation in finished steel. The automobile industry, now assembling units at an unprecedented pace, has been building up a respectable inventory of steel in an effort to carry on if a steel strike occurs. It is believed motordom has enough steel to complete current model schedules strike or no strike. This means that if a strike is averted, there will be little buying by automotive customers in the fourth quarter.

Again, look at the problem from the standpoint of raw materials. The lake carriers have been bringing down a heavy tonnage of iron ore. They are sufficiently ahead of anticipated needs to warrant some vessel operators to lay up a

(OVER)

AS THE EDITOR VIEWS THE NEWS

few ore carriers for grain storage. But if a steel strike should occur, the movement as well as the consumption of ore would cease and it might be necessary to resort to late season navigation to insure an adequate carryover of stocks for next spring.

All along the line management is forced to keep plans sufficiently fluid to conform to a "strike" or "no strike" situation. The economic cost of this confusion is incalculable. —pp. 31, 42

* * *

HIGHER FREIGHT RATES: Expectation voiced in some quarters that sharp competition between waterway, truck and rail carriers might cause the railroads to be reluctant about increasing rates Sept. 1 by the 3.7 per cent permitted by the recent Interstate Commerce Commission ruling may prove to be false. The ICC ruling also affects water carriers, who may increase rates by about the same percentage. Also, highway truckers are considering rate boosts which, if adopted, would become effective after Sept. 1. Therefore it is likely that transportation costs will be higher all along the line.

This contingency, coupled with renewed signs of strength in the scrap market and the possibility of at least a token increase in employment costs, makes one wonder whether the nation will be fighting inflation or deflation a few months hence. —pp. 37, 113

* * *

POSTPONED RELININGS: Changes in the operating rates of furnaces in the iron and steel industry are reflected in an interesting way in the volume of business enjoyed by the makers of refractories. Offhand, one might think that a decline in iron and steel operations generally would bring about a corresponding drop in the demand for refractories.

That this is not strictly true is demonstrated by the present situation. The drop in the steelworks operating rate from at or above capacity to around 80 per cent naturally has eased the need for open-hearth furnace maintenance, which is the major source for refractories demand. As a result, sales of refractories for steelmaking furnaces have fallen off appreciably. However, the slackening in demand for pig iron has given blast furnace operators their first opportunity in years to reline stacks that normally would have been relined several years ago. This has caused a higher demand for blast furnace refractories, which has offset most of the decline in demand for open-hearth refractory materials. —p. 43

* * *

PRODUCING STRUCTURALS: Eleventh in this publication's series on the fundamentals of steelmaking is an article on "Production of Structural Shapes and Rails," Part I of which appears in this issue. The authors are Frederick M. Gillies, works manager, and Wilbur E. Dittrich, superintendent of blooming, structural and rail mills, Inland Steel Co.

Structural shapes and rails have figured for decades in many of America's most spectacular engineering achievements. The skyscraper, which has been developed to a high degree of perfection in the United States, and American railroads, which haul longer and heavier trains than are operated in most other countries, are monuments to the availability of fine steel rolled on structural mills.

In the current installment, the authors describe three typical mills—a 28-inch structural and rail mill, a 24-inch bar mill for smaller shapes and a cross country mill. The important functions of the roll designer and roller also are outlined. —p. 82

* * *

IRON POWDER FOR TOYS: Lionel Corp., manufacturer of well known model trains, has found that powder metallurgy has provided at least a partial answer to the twin problems of reducing costs and alleviating material scarcities.

During much of the postwar period, metal powders were available when many of the conventional materials were difficult to obtain. Also the price of iron powder remained steady at times when the prices of many ferrous and nonferrous metals were rising. A third point is that the quality of powder has improved steadily.

Of course, powder metallurgy is not a panacea for all designers' problems, but Lionel engineers have found that it is peculiarly well-suited for fabricating numerous small structural parts produced in large quantities. For instance, the compacted iron car wheel for model trains, which is produced at a rate of tens of millions annually, probably is the most significant single powder metal conversion in the toy industry. —p. 68

E. C. Shaner

EDITOR-IN-CHIEF

News Summary

STEEL WAGES—Resistance to any recommendations for wage increases or pension programs that may be made by the steel case fact-finding board was indicated last week as an impressive case against such concessions was presented by top steel executives and economists. Witnesses agree that steel companies cannot absorb the cost increases asked by the union. Nor can they pass along such increases to the public which now is clamoring for lower prices. Further, they point out that the union has underestimated the cost of its wage-pension-insurance package. One company points out the union demands would cost more than 65 cents an hour, and that the increased cost would be more than triple the company's net profits for the last ten years. This week will be devoted to the rebuttal arguments and the board will present its recommendations to the President next week (p. 33).

AFTER SEPT. 15, WHAT?—Steel inventories are being built up in anticipation of a possible steel strike after mid-September. Should the strike not materialize, some consumers will have stocks adequate for 60 days or more and probably will be out of the market during a large part of the fourth quarter. A decline in steel mill operations during this period is anticipated (p. 31) . . . Employment prospects are better (p. 32) . . . Manufacturing inventories dropped at a rate of $2.8 billion annually in the second quarter (p. 32) . . . Construction prospects continue bright (p. 32).

SHORT SEASON—Lake shippers face the earliest closing in many years (p. 42). Shipments of iron ore are running ahead of schedule, while demand has fallen off. A few vessels already have been tied up, and operators expect few carriers will operate in late November.

SMALL MILLS—Metalworking companies who bought small steel mills to provide a source of steel supply during the postwar steel stringency now are seeking to dispose of these properties (p. 35). Steel obtained from these facilities is costly, and consumers find it more economical to buy from the larger mills when deliveries can be obtained.

FORD BUILDS NEAR BUFFALO— Ford Motor Co. will build a stamping plant near Buffalo to be in full production within two years (p. 36). By that time the company will be producing 87 per cent of its own stampings, in contrast to 49 per cent now. The new plant will also assure Ford of access to additional sources of steel, because of the water and rail shipping advantages. Bethlehem Steel Corp. may become the chief supplier.

TRANSPORTATION COSTS UP— Industry's transportation costs are going to increase all along the line (p. 37). The Interstate Commerce Commission ruling which permits railroads to hike their freight rates by 3.7 per cent also affects water carriers. Truckers are considering similar increases and are expected to act soon.

NATIONALIZATION—Nationalization of industry is gaining in public acceptance in Britain, strong but not gaining in France, strong but losing in Western Germany and weak in Belgium (p. 41). Britain now wants to take over public ownership of most of its mineral resources. France has temporarily shelved ownership proposals. Conservatives' election victory in Western Germany stalemates nationalization there for the time being.

HERE AND THERE IN INDUSTRY— Airplane motif in 1950 Studebaker styling is likely to cause as much stir as did its original trend-setting design introduced just after the war (p. 45) . . . Modine Mfg. Co. will soon begin mass production of radiators for Ford at Whittier, Calif., (p. 36) . . . Bumper crops necessitate an expanded grain bin program (p. 37) . . . Continental Foundry & Machine Co. will build a $3 million blooming and slabbing mill for Yugoslavia (p. 35) . . . Russia has resumed manganese ore shipments to the United States after a lapse of two months (p. 42) . . . Baldwin Locomotive Works is building a new type of coal-burning, steam-turbine, electric-drive locomotive designed to slash fuel costs 40 per cent (p. 48).

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After September 15, What?

Possibility of steel strike next month clouds appraisal of current upturn. Steel buyers ask deliveries be speeded as protective measure. May live off inventories in fourth quarter

THE CRYSTAL BALL is getting more than the usual workout these days as businessmen try to see what lies beyond Sept. 15.

To them that date is more than the end of Truman's truce in the steel labor negotiations. It is the date at which they believe they will be able to tell whether the recent upturn in business is merely temporary or if it is genuinely the end of the recession.

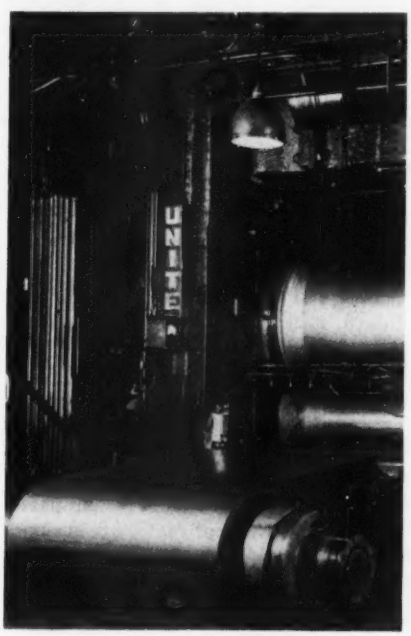
While waiting for the answer business men are not idle. They are trying to riddle it out themselves. What is all of this speculation producing? Roughly, three conclusions: 1. If there is a strike, all calculations as to business prospects will be knocked into a cocked hat; 2. if there is no strike, business activity will flow at a good level; and 3. if there is no strike, business will slough off and the recession that began some months ago will continue its course.

How do they arrive at conclusions 2 and 3? As to No. 2, they say that averting of a steel strike would permit the continuation of the business upturn noted in the last several weeks. This upturn results partly, it is said, from the completion of inventory reduction by numerous industries and conclusion that it is useless to wait further for price reductions. Other buoyant factors, they point out, is existence of a big demand by a growing population for housing, automobiles, and many other necessities of modern living. Some businessmen are saying: Look at the intensified sales efforts. Look at the big volume of money in savings accounts. Look at the great number of people working, despite a rise in unemployment.

Steel Stocks Growing—Even after looking at all of this, there are others who can't feel particularly optimistic. They come up with conclusion No. 3. They admit some of the recent bright spots in business activity stem from completion of inventory reductions, but much of the upturn comes, they declare, from protective buying of steel against a possible strike of steelworkers. They reason further that such an inventory increase is counter to the current basic trend to reduce inventories and it must be expected that those who have laid in additional supplies will drop out of the market and live off the inflated inventories in event there is no steel strike. Because the big figure in the protective buying has been the automobile industry—the leading consumer of steel—any curtailment of buying by it would be sharply felt in the steel industry. Another thing to be remembered, say some analysts, is that the automobile industry has not yet felt the business recession, as many other industries have, but that its time is coming.

Field sales reports on new cars, meanwhile, continue highly favorable. Cars in dealers' hands and in transit total less than 500,000, or an average of about 11 per dealer. This is not considered excessive or even normal, for in prewar years dealers' inventories often averaged 25 per outlet. The auto industry consequently is forging ahead in production and chewing up steel at a rate of 60,000 tons a day.

Operations Continue To Rise—To help support this consumption, along with the needs of all other metalworking companies, the steel industry last week produced ingots at a rate of 83½ per cent of capacity. This was a one-point increase over the preceding week and marked the fourth consecutive week of a slight rise.



BUSY: High demand for cold-rolled sheet and strip keeps mills like this at capacity operation

Business Weather

Conflicting reports show that much of industry still awaits an upturn

CONFLICTING business reports show that much of industry still must get in out of the economic rain.

Many Chicago purchasing agents consider July the best month since the last quarter of 1949, but 35 per cent of 100 surveyed nevertheless thought business conditions poorer in July than June. Chamber of Commerce of the United States says the slide is continuing but it is an orderly readjustment rather than a panicky collapse. A poll of 185 manufacturing companies by the National Industrial Conference Board brought both optimistic and pessimistic opinions on the business situation. Secretary of Labor Maurice Tobin anticipates increased employment over the next six months.

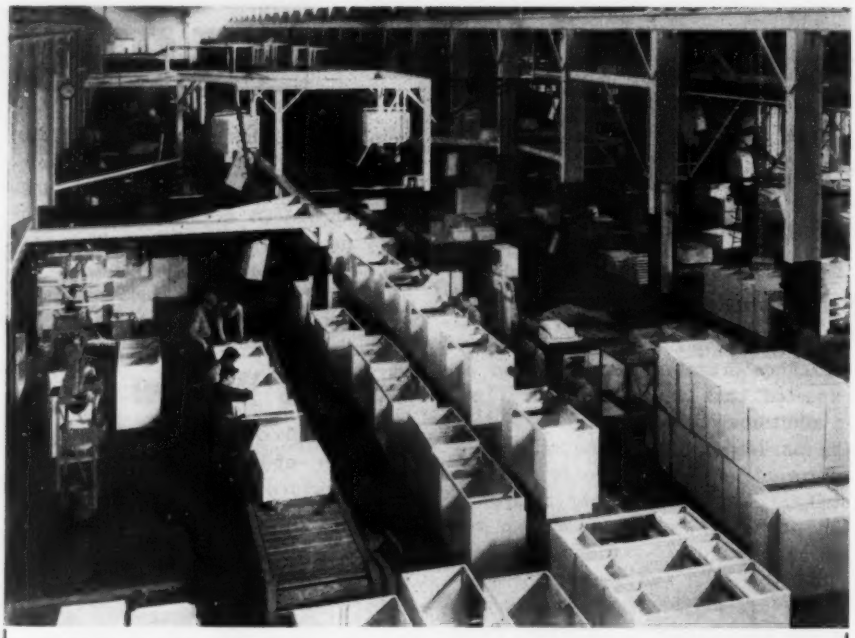
Leveling Off Indicated

Chicago Purchasing Agents' business report for July is "the most encouraging since the last quarter of 1948 and indicates the leveling-off stage has started."

A survey of 100 buyers in the Chicago area reveals that the most notable improvements are in production, backlog and employment. Deliveries continue to be rapid; prices have advanced slightly because of the rise in nonferrous quotations; inventories remain the same. Stabilization in the price structure could be indicated by the increase in number of firms buying on a 60 to 90-day basis. Increase was made at the expense of the 30-day group. Business conditions generally were thought poorer than in June by 35 of the purchasers; 65 believed them the same or better.

Tobin Sees More Jobs

A decided increase in employment and a substantial drop in unemployment. This is the view of Secretary of Labor Maurice Tobin takes of



BETTER BUSINESS: In response to improved demand, steel kitchen cabinets are being produced at an increased rate at Canton, O., by Berger Mfg. Division, Republic Steel Corp. Pickup in kitchen cabinet business, along with improved demand for other products Berger fabricates has pushed employment up 300 persons over the postwar low mark at the company's two Canton plants. Added this month have been 133 employees, making a current total employment of 1840. The company is working on a 2-1/3 turn basis

the job situation for the next six months.

The secretary expects industrial employment to rise about the middle of September, as result of low inventories and a pickup in orders.

Unemployment may drop even faster than employment gains as temporary summer workers return to schools and other winter vocations.

Chamber Sees Upturn Signs

Chamber of Commerce of the United States sees no reason for deep gloom at business prospects because:

1. Plant and equipment expenditures were above last year for the first half of 1949 and are expected to fall only 4 or 5 per cent in this third quarter below the same period of 1948.

2. Consumers' price index remained slightly above 169 for five months, not far below its postwar peak. The wholesale price index, showing a much sharper drop, nevertheless has declined moderately compared to past recessions. In July this index began to rise again.

3. Money supply remains near last year's record levels. Excess reserves of the banking system have not declined greatly. Business loans, falling steadily for months, turned up during the last week of July.

4. Consumer credit, up steadily since the end of the war, is still expanding although at a slower rate.

5. Export volume has remained about the same for the past 18 months. Excess of exports over imports stays constant.

6. Government is returning to deficit spending which will tend to be inflationary. In the short run this will help business.

7. Financial liquidity is high, interest rates low, mortgage structure improved, stock market rising.

Conference Polls Industry

Many manufacturing companies haven't yet begun the up-hill business climb.

National Industrial Conference Board, in a survey of 185 firms, finds that half of them expect fewer new orders in the second half of 1949 than in the first and that three-quarters foresee a still poorer showing compared with the last six months of 1948. Three-quarters also predict a decline in profits in 1949 compared with 1948. Principal factors contributing to lower profits are lower volume of sales, inability to reduce operating costs adequately, inventory losses and lower selling prices.

Hardest hit with respect to new orders are foundries, steel companies and makers of electrical appliances and machinery and office equipment. The petroleum industry is the most optimistic about future prospects.

Output Hits $256 Billion

Inventory liquidation pulled national output down in the second quarter even though business outlays for plant and equipment and consumer spending stayed high, Commerce Department reports.

Gross national product slipped from a $262.5 billion annual rate in the first quarter to a $256 billion rate in the second. Businessmen added to their stocks at a $4.1 billion pace in the first quarter, but in the second they cut them at a rate of $2.8 billion.

Despite the inventory decline business operations were "at a very high rate" in the first six months of 1949, the department reports. A preliminary estimate of a $256.1 billion annual output rate in the second quarter is $200 million above the $255.9 billion estimate made for the first quarter. The alltime record pace was set in the last quarter of 1948, at $270.3 billion.

Gas Heater Sales Hold

National sales of gas water heaters are only 2 per cent below a year ago and two and a half times greater than prewar, says James F. Donnelly, A. O. Smith Corp., Kankakee, Ill., and chairman of the Gas Appliance Manufacturers Association's promotion committee. Sales of gas water heaters this June was 121,000 compared with 122,000 in June, 1948.

Nonferrous Employment Up

Employment in the nonferrous metals industries is higher than in early summer, reports Robert C. Goodwin, director of the Bureau of Employment Security.

FRB Sees More Building

Federal Reserve Board says construction activity is "likely to continue to expand moderately in the near future."

This forecast is published in the board's monthly bulletin and is based on recent construction contract awards. The board predicts that public work will continue to account for a relatively large proportion of total nonresidential construction compared with the earlier postwar period. A considerable change has taken place in the housing market: A larger proportion of the new housing being built is of the apartment type for rent rather than for sale.

Steel Men Argue for Wage Stabilization

Increases of dimensions asked by union cannot be absorbed nor passed along to consumer in form of higher prices, witnesses tell fact-finding board

AN IMPRESSIVE defense against the fourth-round wage, pension and insurance demands of the United Steelworkers-CIO was presented to the President's fact-finding board last week by a parade of top steel executives and nationally known economists.

Because the outcome of the steel wage dispute will have far-reaching effects on the whole national economy, the National Association of Manufacturers was granted permission by the steel companies to argue against further wage, cost boosts.

Witnesses told the board that increased costs can no longer be absorbed by the industry nor passed along to the public.

Increases asked by the union would cost many companies far more than average earnings over the past decade.

The union, said steel executives who have checked pension and insurance costs with independent experts, has underestimated the cost of the pension and insurance programs asked.

Pensions in most steel contracts are excluded as a bargaining subject this year.

The procedure under which the steel wage case was presented to the fact-finding board was repeatedly attacked as a political move, designed to give the union advantages which it could not have obtained under free collective bargaining.

Asks Return to Bargaining—Edward L. Ryerson, Inland Steel chairman, demanded that his company's negotiations with the union be returned for good faith collective bargaining as provided by law.

Mr. Ryerson charged: "The breaking off of real and honest collective bargaining (at Inland) resulted not because of disagreement between the parties involved, but from influence of parties who were in no way associated with or intimately concerned in these negotiations."

His charge was substantiated by other Inland officials who revealed that the union in 1947 and 1948 refused to permit Inland to pay its employees more than the wages paid by U. S. Steel. Termed part of the union's "global strategy" Inland was told: "You will sign what the corporation signs . . . or else."

Cites Past Experience—Referring to past experience with politically appointed boards, Mr. Ryerson said: "Recent history with respect to the outcome of other government-appointed boards should certainly be reviewed in the light of this hearing. The records will show that in each instance where wage increases were recommended and granted, not only was the cost of every product affected, but the price the public had to pay was promptly increased. The American public has a vital interest in your decisions and must hold you responsible for the consequences to our national economy."

EDWARD L. RYERSON

Costs Triple Profits—If union demands for increased pay and social security benefits were imposed, the A. M. Byers Co., Pittsburgh, would suffer an annual loss of $2,357,000, the company told the board. In the ten best consecutive years, from 1939 through 1948, Byers earned an average net profit of $1,143,000. Union demands were estimated to cost the company $3.5 million annually.

Carl W. Myers, Colorado Fuel & Iron Corp. president, pointed out that the package asked by the union "cannot be borne by CF&I at this time of declining demand without a general increase in steel prices."

The increase in labor costs would "threaten the job security of every employee of our corporation."

Lukens Steel would have suffered a loss of more than $2,888,000 in the past fiscal year if the union's current demands had been in effect, President Robert W. Wolcott said.

Price Increases Ruled Out—Possibility of raising prices to support new wage or welfare provisions is ruled out by the present business situation, said W. H. Colvin Jr., Crucible Steel president. "A compensating increase in prices at this time would adversely affect volume."

D. W. Frease, president of Empire Steel Co., told the board: "If Empire is now burdened with any increase in wages, insurance or the cost of an insurance program, it will mean complete discontinuance of operations."

Continental Steel Corp. contended

Allegheny Ludlum Breaks Even at 60 Per Cent

WHAT is the steel industry's break-even point? This question is the subject of much controversy in the current steel wage dispute.

Guesses range from a low of 32 per cent, by Robert Nathan, economist retained by the United Steelworkers, to a high of 70 to 75 per cent. Practically all guesses are by persons who lack all the facts necessary to make an accurate estimate. Steel companies executives, who are in the best position to know the answer, generally are reluctant to make an estimate. They point out that break-even points vary widely from company to company, and from week to week. They also note that integrated steel companies operate railroads, steamship lines and other facilities whose capacity cannot easily be determined.

A partial answer on the break-even point question is before the steel fact-finding board. Hiland G. Batcheller, president, Allegheny Ludlum Steel Corp., says that under conditions now existing his company's break-even point is around 60 per cent of capacity.

His conclusion is confirmed by Allegheny Ludlum's second quarter financial results. During the June quarter the company made only $17,806, and operated at a loss in May and June. Operations averaged 60 per cent of capacity.

that granting of a 30-cent wage and welfare increase would cost that company about $1 million more than prospective 1949 profits before taxes.

Bethlehem To Resist—"We intend to resist any measures which are designed to cause further inflation," A. B. Homer, Bethlehem president, declared. "This is no time for further concessions. The facts do not justify any more wage increases and in the national interest the ruinous inflationary spiral of wages and prices must come to an end."

Mr. Homer got under the skin of the panel members when he said: "It is easy to understand why Bethlehem was reluctant on the basis of past experience to give its approval to an irregular procedure which appears to be designed merely as a vehicle for forcing upon us important concessions to the union."

Samuel Rosenman, board member and former adviser to President Truman and the late President Roosevelt, took exception to the statement and asked that it be withdrawn.

Mr. Homer said he hoped he was wrong in his fears regarding the political setup of the board.

NAM Official Testifies—To testify in behalf of thousands of business organizations and the American public on the importance of the issues involved appeared Ira Mosher, past president of the National Association of Manufacturers. His appearance was in sharp contrast to the association's usual policy of remaining out of decisions of the management of individual companies or industries.

In the case of the current steel dispute, the association holds that the effects will be more far-reaching than any one company or any one industry and that it is imperative and in the long-range public interest that it take an active part to inform the American people that the critical issue which largely may be decided by the action of the fact-finding board is whether the nation is to have collective bargaining and a free economy or national bargaining, compulsory arbitration and statism. Mr. Mosher maintains that the use of this presidentially appointed board is extra-legal. He asked the panel to "remand the case to the parties concerned for genuine collective bargaining."

Pension Bargaining Story

The story behind the steel industry's refusal to bargain on pensions this year was told clearly to the fact-finding board.

John A. Stephens, vice president of U. S. Steel, says the corporation's

IRA MOSHER

labor agreements with the union by their express terms preclude any bargaining on the union's pension demands until the expiration of these agreements in April, 1950.

"My associates and I made a bargain with the union. The union agreed we would not be asked to bargain on pensions in the year 1949. It is my firm conviction that the bargain, as I have stated it, was the understanding and was the voluntarily accepted position of the union—until very recently.

"The issue is: Will the parties to a labor contract live up to it, or is a labor contract but a scrap of paper, an instrument of convenience to be destroyed when expediency so dictates?"

Precluded by Contracts — Other steel industry representatives told the board that the language of the contracts excluded pensions as a bargaining topic.

T. F. Patton, Republic Steel, pointed out that the pact provided for a reopening to negotiate only for "a general and uniform change in wage rates, and/or program for life, accident, health, medical and hospital insurance benefits." Mr. Patton contended there is nothing in the Taft-Hartley act or in court decisions bearing on the case to show that the term "wages" is synonymous with the terms "wage rates" or "rates of pay."

Similar arguments were presented by more than a dozen steel firms.

Union Underestimates Pension, Insurance Costs

PENSIONS and social insurance programs asked by the United Steelworkers would cost most companies far more than is estimated by the union. This is indicated by cost appraisals obtained by the individual companies from insurance companies and from pension consultants since the union made known its demands.

The union estimates the cost of its demands at 30 cents an hour. These include a 12½-cent hourly wage increase, $125-a-month pensions which the union says would cost about 11¼ cents an hour, and social insurance which the union estimates would cost about 6¼ cents an hour.

More Than Double—Lukens Steel Co., Coatesville, Pa., retained a firm of nationally known pension and insurance consultants to estimate the cost of the union's social security demands to that company. The consultants advised the company that instead of costing the company 30 cents an hour, as stated by the union, the wage, funded pension and insurance demands would cost a total of 65½ cents an hour.

Allegheny Ludlum received an insurance company appraisal that the pension and insurance programs would cost that company $546 per employee per year. On the basis of 2000 hours worked per year this would amount to about 27 cents an hour.

Since pension and insurance liabilities accrue even though employees are furloughed, the actual cost in terms of hours worked would be much greater. Allegheny Ludlum employees, including those now on furlough, are working at an average rate of 1260 hours a year. This would make the cost of pensions and insurance about 44 cents an hour.

Combined with the request for 12½ cents wage increase, the demands would mean a total cost increase of from 40 to 56 cents an hour, exclusive of a sum of $560,000 payable to the insurance company at once to set up pensions for employees over age 65.

Idea Borrowed from Lewis—Industry observers believe the United Steelworkers have borrowed a page from the book of John L. Lewis, president of the United Mine Workers. When the miners' welfare fund was established, the union contended it could be financed by a 10-cent royalty on each ton of coal mined. A few years later, the union insisted this levy be raised to 20 cents a ton. Today, independent actuaries estimate that 49 cents a ton would be required to maintain the welfare fund on a sound basis.

Buyers Sought for Nonintegrated Mills

Phoenix Iron Works and Phoenix Bridge Co. advertised for sale. Efforts made to dispose of other small plants. Foreign countries appear to be outlet for abandoned hand mills

CURRENT ADVERTISEMENTS offering for sale the facilities of Phoenix Iron Co. and Phoenix Bridge Co. at Phoenixville, Pa., focus attention anew on the fate of small, nonintegrated steel mills.

The Phoenix facilities are offered by the H. H. Buncher Co., Pittsburgh. Pending any possible sale of them, the Buncher company will continue to operate the bridge company. Expected to be liquidated by the Buncher company, however, are these primary facilities of Phoenix Iron Works: Eight open hearths rated at 27,000 tons of ingots monthly, a 36-inch reversing blooming mill, a 24-inch bar mill and a 22-inch bar mill.

The Phoenix Iron Works had until recently been operated by Kaiser-Frazer interests.

Stemming from the declining need for nonintegrated mills are rumors that Empire Steel Co., located at Mansfield, O., and owned by Studebaker Corp., might be taken over by other interests and combined with Reeves Steel & Mfg. Co., Dover, O., and Newport Steel Corp.'s Newport Rolling Mill Division at Newport, Ky.

Apollo Plant Offered—Idle since early in July is the Apollo, Pa., Division of Phoenix-Apollo Steel Co. M. N. Landay Co., Pittsburgh, purchased this property and intends to liquidate the facilities by Oct. 1 if no new concern can be induced to operate them. The Apollo plant has no melting facilities. Its eight rolling mills have a monthly capacity of about 9000 tons of hot-rolled, pickled sheets up to a 26-inch width. The plant's equipment also includes facilities for galvanizing, corrugating, and the production of culvert sheets.

Hudson Motor Car Co. has discontinued operations on the hand mills it installed in the old Shenango tin plant at New Castle, Pa., and the equipment is for sale. The building has been purchased by the Bossert Co. of Utica, N. Y., subsidiary of Timken-Detroit Axle Co., and is utilized in production of axles and housings.

Canton Plant Idle—At Canton, O., Borg-Warner Corp.'s Superior Sheet Steel Division plant has been idle since early July, and no buyer has been found to take over operation of the facilities.

General Electric Co.'s Mahoning Valley Steel Co. plant at Niles, O., is operating on a curtailed basis, and there are reports it would be sold promptly if a buyer were found.

Steel Producers Inc. never did reach commercial production of hot-rolled sheets at property leased at Toronto, O., from Follansbee Steel Corp. A roughing mill and two finishing mills had been installed.

The Parkersburg Steel Co., Parkersburg, W. Va., continues to operate and company officials say there is no likelihood the mill will be closed in the immediate future. Its annual sheet capacity is about 36,000 net tons.

Destiny of hand mills in abandoned plants appears to be either a scrap yard or foreign countries. A domestic market exists, however, for shearing, leveling, galvanizing facilities and cranes, brokers say.

Continental Builds Mill for Tito

CONTINENTAL Foundry & Machine Co. will build a blooming and slabbing mill for a Yugoslav steel plant. The facility, valued at about $3 million, will be constructed at Continental's East Chicago, Ind., Coraopolis, Pa., and Wheeling, W. Va., plants and will be delivered in 12 months.

The mill will not increase Yugoslavia's ingot capacity. It will be used to turn out rails and other structural steel. This is the first time since the cold war began that the administration has agreed to ship war-potential goods to a Communist-ruled nation.

Annealing Furnaces Ordered

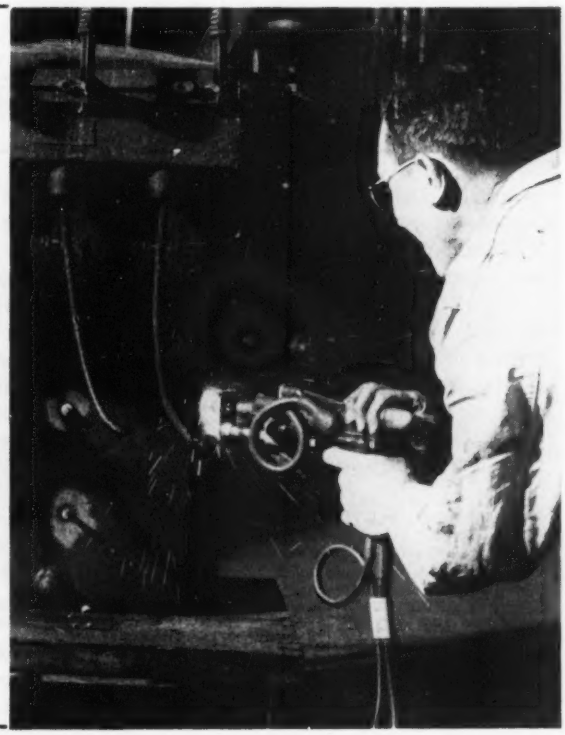
SURFACE Combustion Corp., Toledo, O., will build 20 coil annealing furnaces and 60 bases for the Lackawanna, N. Y., works of Bethlehem Steel Co. Furnaces will be of the horizontal radiant tube type and will be arranged with the 60 bases in a double row, each base accommodating eight stands of coils.

Annealing covers will accommodate coils 67 inches in diameter which may be piled to a maximum height of 148 inches. Total charge of coiled steel per base is about 450 tons. This means that as many as 27,000 tons of steel may be in process at one time.

Transformers Ordered for Coast

WESTINGHOUSE Electric Corp. reports receipt of an order for four 220,000 volt transformers from Southern California Edison Co. Valued at slightly less than half a million dollars, the transformers will be installed at the Edison "Big Creek No. 4" station near Fresno, Calif.

WHITTLING COST: A large public utility company has whittled cost of connecting lightning arrestors to distribution transformers by use of the lightweight automatic Nelson stud welding gun. It permits installation of arrestors directly to the tanks and eliminates need for crossbar supports. It also makes possible raising of transformers to pole position with arrestors already in place. New method has resulted in cost savings of up to 25 per cent. Gun is controlled by an automatic timer and is operated from one of the shop's standard dc welding generators



Radiator Mass Production

For Ford's western plants being undertaken by Modine Mfg. Co. at Whittier, Calif.

MASS production of automobile radiators to supply Ford Motor Co.'s western assembly plants will be started within 90 days by Modine Mfg. Co., Racine, Wis. Modine is purchasing a plant in Whittier, Calif., and its operations will be the first of this type in a California plant.

Production will be at an initial rate of $3 million annually and will supply Ford's plants in Long Beach and Richmond, Calif., Dallas and the Lincoln-Mercury plant in Los Angeles. It marks another step in Ford's western purchasing program.

When established two years ago, the program set as its first goal the buying of $50 million worth of automobile components annually from western fabricators. The program is now well beyond that figure and continues to grow.

Industrial Building Mark Set

Peacetime records for industrial development in Los Angeles county were broken during July with $34,115,000 invested in new or expanded facilities. This total was exceeded only by two wartime months.

According to the Chamber of Commerce's industrial development committee, the seven-month total of $72,435,000 invested in new or expanded plants this year exceeds by $250,000 the 12-month total for 1948.

Permanente Adds Products

New aluminum finishing equipment designed to broaden and diversify the products rolled at Permanente Metal Corp.'s Trentwood mill in Spokane, Wash., is being added at a cost of $1 million.

Two machines have been installed to coat aluminum to ease painting operations. An alodizer sprays a primer coat on siding and screens and the other rolls metal etching paint onto sheet aluminum.

Other equipment includes a degreaser which removes oil from rolled aluminum by means of a chemical bath and dries them with ultra-violet rays and an embossing machine which adds to strength of aluminum sheets without adding to their thickness. Machinery has also been installed to make window blinds resembling venetian blinds except that they have fixed louvres and cannot be adjusted as are conventional venetian blinds.

Manufacture of aluminum doors, windows and window and door frames will be started in the near future at the plant. The company also plans to build an all-aluminum house at Trentwood in the next ten months.

Permanente is currently surveying the automobile market with the intention of increasing the number of aluminum components in passenger cars.

Kaiser Lights Coke Ovens

First stage in Kaiser Steel Corp.'s $36 million expansion program at Fontana was reached when 45 new coke ovens were lighted. Ninety coke ovens now are in operation at the mill.

A gradual "warmup" of the new battery of ovens will extend for two months.

12-HOUR SUPPLY: This huge bank of motor blocks at the Tonawanda, N.Y., Chevrolet plant is only 12 hours' supply. Tonawanda factory and Flint, Mich., engine plant are the two engine sources feeding Chevrolet assembly lines which set an all-company record for production in June

Ford Builds Buffalo Unit

Construction will begin this fall on new stamping plant for car body parts

CONTRACTS have been awarded and construction will begin this fall on a new pressed steel plant near Buffalo for production of Ford passenger car body parts, says Del S. Harder, Ford Motor Co. vice president in charge of manufacturing.

The plant will be on a site in Hamburg township purchased earlier this summer. Production will start as soon as plant and equipment are ready, but capacity output is not expected for two years. Employment by that time will be about 3500.

Supplier Dislocations — Ford's pressed steel production at the Rouge plant now accounts for 49 per cent of its total stampings. The balance is furnished by outside suppliers, chiefly Murray Corp. of America and Budd Co. After completion of the Buffalo plant, 42 per cent will be produced there and 45 per cent at Rouge.

Company's plan is to move some of the Ford body stamping work to Buffalo and then to move into the Rouge plant some of the Mercury, Lincoln and truck stamping jobs now done outside. Murray is chief supplier now of Mercury body stampings. Budd makes Ford's truck cab stampings and miscellaneous Lincoln stampings.

Structural Award to Bethlehem— Bethlehem Steel Corp., which is expected to be the chief supplier of sheet steel for the new Ford plant, has been awarded the contract for the facility's 11,000 tons of structural steel. Mr. Harder points out that location of the pressed steel plant in Buffalo assures the company of major steel sources there "with access to additional supplies due to the excellent water and rail shipping advantages."

All Transportation Costs To Rise

ICC approval of railroad rate boosts also applies to water carriers. Truckers expected to raise their charges after Sept. 1

METALWORKING industry's costs will rise for water and road transportation, as well as for rail traffic.

The Interstate Commerce Commission ruling which permits railroads to hike their freight rates by 3.7 per cent Sept. 1 also affects water carriers who can boost their rates by about the same percentage. Truckers are considering similar increases, and they are expected to act after Sept. 1.

Competitive Situation Static—Since higher transportation costs will be general, the rail, water and road competitive situation will remain about the same. Metalworking companies had been speculating that competition-minded railroads might excercise discretion in boosting their rates the full 3.7 per cent.

Special rates will probably be granted for only a few products like coal and in rare individual cases. Kaiser-Frazer Corp., for example, will have an appeal heard by the Traffic Executives Association of Eastern Railroads in New York, Aug. 24. Kaiser seeks to cut steel rates from Cleveland to Willow Run, Mich., to 24 cents per 100 pounds on carload shipments. The regular rate would be 37 cents on Sept. 1.

Steel producers believe that this latest freight jump, added to others since the war, antiquates the prewar distribution pattern which could be only partly resumed now even if Congress legalizes freight absorption in meeting competition.

Pittsburgh producers are already making plans to intensify a drive to secure additional customers within their logical marketing areas.

Pittsburgh at Disadvantage—The rail rate advance will place Pittsburgh mills at a further freight disadvantage on shipments into major consuming centers like Detroit and New York. The rail rate on carload steel shipments from Pittsburgh to Detroit will jump to 51 cents per 100 pounds. It was 29 cents in 1938. Rail steel shipments from Pittsburgh to New York will amount to 62 cents, against 36 cents in 1938.

The latest boost in freight rates comes at a time when carloadings are about 10 per cent below a year ago. The hike coincides with inauguration of a five-day week for railroads' nonoperating employees. Cost to the railroads of the new work week will be $380 million per year. Total additional revenue to the railroads from this further increase will amount to $293 million. This added to the $391 million resulting from the interim increase of 5.2 per cent earlier in the year should give railroads an estimated $684 million more a year. The new set of increases results in a freight rate structure 57 per cent higher than that in effect June 30, 1946.

UP Extends 40-Hour Week

Extension of the 40-hour week to Union Pacific Railroad's nonoperating employees will boost costs 16 to 20 per cent, says P. J. Lynch, vice president in charge of operations.

About 25,000 employees will be affected. The railroad will close 270 stations on Saturdays throughout the 11 states in which it operates. In cities where stations are kept open on Saturdays, city ticket offices will be closed. Passengers will be accommodated at depot ticket offices. Based on 1948 operations, the cost of putting into effect the 40-hour week would be about $25 million. The cost, however, will actually be less than that since the road has trimmed its force in line with decreased business.

Congress Confers on F.O.B.

House of Representatives has cleared the way for a conference with the Senate to iron out differences in freight absorption bills passed by both houses.

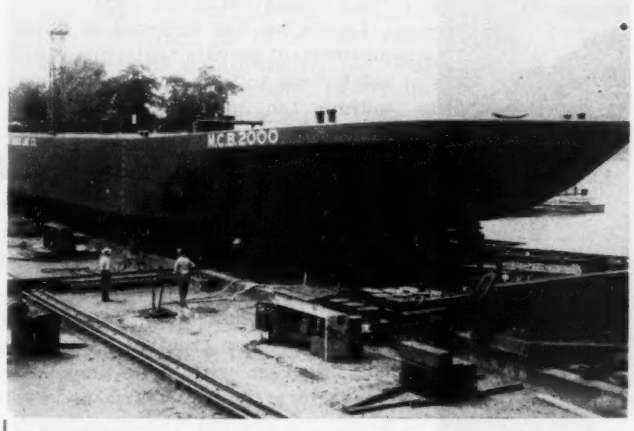
By a voice vote the House named conferees refusing to accept Senate changes in the lower house's measure. Last week the Senate refused to reconsider its earlier action in legislation designed to clarify the extent to which businesses can use the delivered price system and absorb freight without fear of prosecution.

Rep. Wright Patman (Dem., Tex.) said the House conferees will "not budge an inch" from the House position on the issue.

U.S. Contracts for Storage Bins

GOVERNMENT is going deeper into the grain storage business. It began awarding contracts Aug. 17 for 45,000 steel, aluminum and wooden bins to cost about $150 million.

Commodity Credit Corp. started the program last week when it let contracts for construction of 13,790 movable bins with a total capacity of 112,837,640 bushels. Nineteen companies throughout the Midwest and Texas have the orders.



TRAILING BARGE of a new integrated two-unit high speed petroleum fleet for Mid-Continent Barge Line Co., Minneapolis, is launched by Dravo Corp., Pittsburgh.

Sweeping rake and rounded, toed-in corners are features of the leading barge (right). Each unit has a different hull form designed for its position in tow

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Legislative log jam threatens to keep Congress in session well beyond Labor Day. Measures important to business still on treadmill

HOUSE OF REPRESENTATIVES last week refused to pass another stop-gap spending authorization, thus highlighting the jam of appropriation bills and other legislation which threatens to hold Congress in session till well past Labor Day.

More as a gesture of rebuke than anything else, the action brought into sharp relief the log jams in Congress.

Speaker Sam Rayburn (Dem., Tex.) announced that Democratic leaders in the House expect to declare an unofficial two-week recess starting this week and extending over Labor Day. This would give the Senate a chance to loosen the law-making crush.

Major measures of interest to business which are still on the legislative treadmill include: Minimum wage legislation, the O'Mahoney basing point bill and the military aid program.

Labor Secretary Maurice J. Tobin, commenting on the minimum wage bill last week, expected an improved bill to come from a joint House-Senate conference after the Senate acts on minimum wage legislation. He expected the Senate to fill the deep cuts in wage and hour coverage made by the House when it passed a 75-cent-an-hour bill.

Typical of the wrangling which has kept much legislation in the committee stage was the great stress laid on whether "will" or "may" should be used in connection with the Kefauver amendment to the O'Mahoney freight absorption bill.

Members of the House Foreign Affairs Committee were slated to go before the House Rules Committee to ask that the military assistance program be given the right-of-way.

Economy in Military Spending

STARTING a continuing program for economies in Defense Department expenditures, Defense Secretary Louis Johnson appointed a National Defense Management Committee and a Management Advisory Group. The committee will be headed by Gen. Joseph T. McNarney who will be relieved from duty as chief of the Air Force materiel command and assigned to the Defense Department.

Other members of the committee are: Army Secretary Gordon Gray, Navy Undersecretary Dan A. Kimball and Air Force Assistant Secretary Eugene M. Zuckert.

Robert Heller & Associates, Cleveland, business management consultant, will provide personnel for the Management Advisory Group. This group will make a study and report on the entire defense establishment and will assist in putting into effect recommendations approved by the committee.

No Need for 5 Per Centers?

To provide a central directing service to businessmen seeking contracts with the military services, the Military Procurement Information Office has been set up by the Munitions Board.

Staffed by representatives of Army, Navy and Air Force, the new office was established at the direction of Defense Secretary Louis Johnson. It will direct businessmen to appropriate service offices; it will not assist them in obtaining contracts.

New MB Chairman Named

Carl A. Ilgenfritz, vice president in charge of purchases of United States Steel Corp., was named to succeed Donald F. Carpenter as chairman of the Munitions Board. Mr. Carpenter retired recently. Mr. Ilgenfritz has been acting as an adviser to the Federal Bureau of Supply; he also served on the Hoover Commission. He has had almost 40 years of purchasing experience.

CARL A. ILGENFRITZ

Plants May Get Postwar Revival

WAR-BUILT government magnesium plants now idle may get a postwar revival as a result of new developments and continued research.

A budget request for funds which would have permitted putting these plants in push-button standby condition, has not yet been acted upon, and plans may be deferred. But research has indicated new uses for the metal. In wartime, production never quite caught up with lend-lease, aviation, and incendiary manufacture. Granted the necessary fabricating plants, the oncoming aviation program might adapt magnesium to a number of purposes.

Principal requirement, besides an appropriation for restoring plants to near-readiness, is a sheet mill to turn out magnesium sheets in needed sizes. Mills now extant generally can produce material in forms that are in general demand, as for dry cells, etc. For the aviation program and for certain other uses a sheet mill comparable to some steel sheet mills is needed.

Such a plant would cost $25 million. While it could meet anticipated demand, some government officials believe if this mill demonstrated economies of production by continuous operation, private operators might enter the field.

Discussion has centered in a joint government-private enterprise project for one mill of this class. So far nothing tangible has resulted.

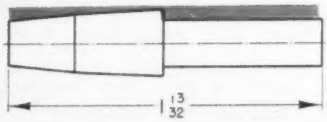
Wire Rope Standards Published

REQUIREMENT standards covering wire rope for export trade have been published by the Bureau of Standards.

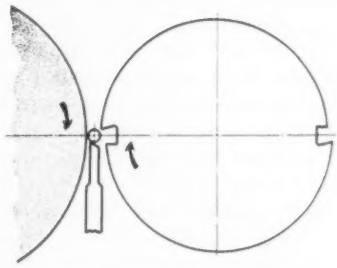
The standards cover material requirements, construction, test methods, together with definitions, safety factors, and glossary of terms useful for mutual understanding between buyer and seller of wire rope in export trade. Standard construction and grades of wire rope and strand, highway guard cable, air-

HOW TO INFEED GRIND 1200 parts per hour

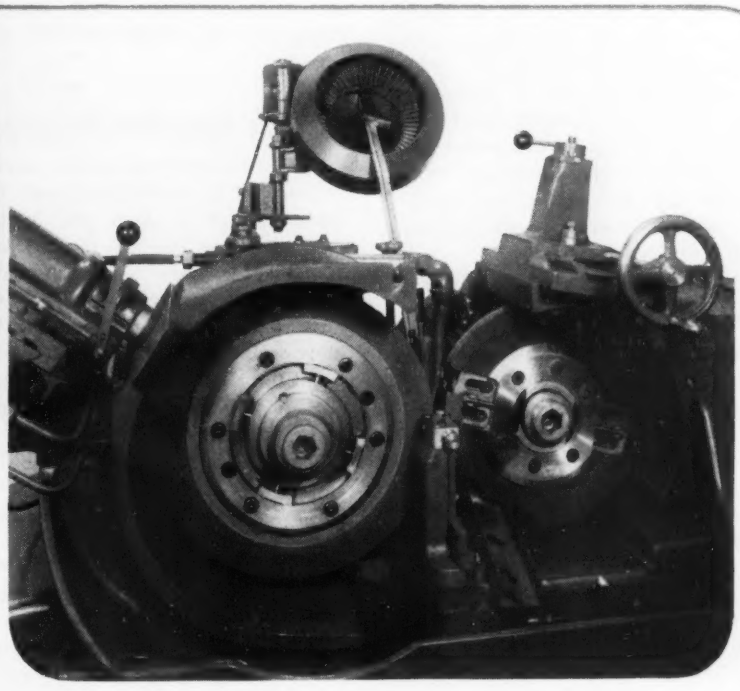
without moving the infeed slide



Drawing of the part FILMATIC Centerless ground on the equipment illustrated below.
Part name.....feed tip
Material.....hard rubber
Operation.....profile grind
Stock removal.....from solid
Production.....approx. 1200 per hour
Equipment..CINCINNATI FILMATIC No. 2 Centerless, tooled up by Cincinnati Application Engineers



This drawing illustrates the principle of rotary infeed grinding on a CINCINNATI FILMATIC Centerless.



In this illustration guards have been removed to show setup for rotary infeed grinding operation on CINCINNATI FILMATIC No. 2 Centerless Grinder.

CINCINNATI

Nearly everyone is familiar with reciprocating motion produced by rotating cams or eccentrics. Cincinnati Engineers applied this basic principle of mechanics to centerless grinding, *not to produce reciprocating motion, but to eliminate it.* The regulating wheel is trued to a single, or as in this example, a double cam shape (see drawing). As it rotates, a part inserted at either point of minimum radius is forced against the grinding wheel by an amount equal to the "rise" of the cam trued sector of the wheel. Spaces in the wheel permit the parts to be loaded and ejected.

The CINCINNATI FILMATIC No. 2 Centerless illustrated above employs this rotary infeed principle to eliminate reciprocating motion of the slides, while accurately grinding two parts each revolution of the regulating wheel. Production rate, 1200 per hour.

To keep pace with the machine, a hopper feed attachment is included with this type of equipment. A truing unit, designed specifically for rotary infeed grinding operations, trues the regulating wheel to the desired shape. ¶ CINCINNATI FILMATIC Centerless Grinders, equipped for rotary infeed grinding, offer exceptionally low costs to many high production industries. Can you employ this technique? Our Application Engineers will help you explore the possibilities. When writing, you will save time by including sequence of operations and blueprint of part.

CINCINNATI GRINDERS INCORPORATED

CINCINNATI 9, OHIO, U. S. A.

CENTER TYPE GRINDING MACHINES • CENTERLESS LAPPING MACHINES • CENTERLESS GRINDING MACHINES

craft cord, elevator rope and bridge rope are shown.

A 33 per cent net reduction in variety of stock items will result if a proposed revision of simplified practices for the wire rope industry is adopted by the Bureau of Reclamation.

The bureau has announced the proposed revision, for consideration of interested industries. The proposed revision adds a new table but effects further reductions in variety of stock items. It includes sizes, construction, grades and breaking strengths of a substantial majority of wire rope tonnage.

General adherence to the 21 tables shown in the recommendation, says the bureau, will effect a net reduction from 987 to 657 in variety of stock items. The major production and use of wire rope is covered by 4 different rope constructions, where the reduction in variety is from 352 stock items to 182, or 48 per cent in this major group.

Scrap Metal Bill Backed

WHEN the Senate Finance Committee approved unanimously an administration-supported House measure to continue tax-free scrap metal imports through June 30, 1950, Chairman Walter F. George would not comment on the possibility of a presidential veto of a reimposition of a two-cents per pound duty on copper. But he said the State and Commerce departments had opposed reimposition of the copper tax. Copper import tax exemptions were continued by congressional action through June 30, 1950, earlier in the session.

NLRB Declines Jurisdiction

NATIONAL Labor Relations Board declined to take jurisdiction in a dispute involving the Steel Fabricating & Machinery Co. Inc., Birmingham, and a shopmen's local of the International Association of Bridge, Structural & Ornamental Iron Workers.

The board found that although the concern did some out-of-state business, its operations were essentially local in character, hence was not warranted in assuming jurisdiction.

AEC Assured Fuel

IN PASSING the Independent Offices Appropriations bill which provides funds for various unattached commissions and other federal agencies, the Senate made sure the Oak Ridge, Tenn., installations of the Atomic Energy Commission will have fuel, regardless of coal stoppages.

AEC a year ago contracted with a natural gas company for a pipeline to supply supplementary fuel to its Oak Ridge plant. The grounds for the installation were necessity for national defense, but when the appropriation came up, Senator Kilgore (Dem., W. Va.) sought to amend the bill to preclude use of natural gas at Oak Ridge. The Senate rejected the amendment.

Fuel saving as a result of the pipeline is estimated at $1.2 million annually. The AEC plant was originally dependent on coal alone, for fuel.

Metallic Compound Developed

DEVELOPMENT of a new metallic compound to withstand high temperatures of modern gas turbines, jet and rocket engines is reported by National Military Establishment.

The compounding process, using zirconium and boron, provides an alloy which survived highest temperature blasts of any materials extensively tested to date. Further tests are slated.

A group under the National Research Council, Canada, is conducting extensive tests of the scaling of heat-resistant alloys. Work has been directed toward finding out why some types of oxide scale, formed on alloys at high temperatures, act better than others as a protective coating of the underlying metal. Scale formed on alloys at high temperatures exhibits different degrees of protection at different times as the heating continues.

Practiced What It Preached

PROVING that it practiced what it preached, the Hoover Commission refunded $31,000 to the U.S. Treasury when it finished its work.

The Hoover Committee, an outgrowth of the commission, suggested that other government agencies do the same. Seventeen agencies which opposed the commission's recommendations for governmental reorganization, it was pointed out, had budgetary deficiencies in the past year.

The Citizens' Committee for the Hoover Report remarked that "some 40 per cent of the Hoover Commission Report for economics in government operations could be accomplished within the bureaus and agencies by executive action."

This committee admitted though that "there has been very little to date" of such kind of action and said there were "grim reminders that the road to reorganization is strewn with obstructions in Washington."

New Requirements for Exports

SPECIAL, new requirements have been put into effect governing applications for export of galvanized iron and steel sheets.

Applications to the Office of International Trade, for export licenses in the fourth quarter, must show with respect to each classification in the schedule involved, the total quantity in pounds, of sheets to be exported, in both 17 gage and heavier, and lighter than 17 gage.

Steel Prefabs OK'd for Export

PREFABRICATED houses, chiefly of steel have been released from export restrictions and may now be exported to designated countries on general licenses.

Open end quotas were established for a lengthy list of iron and steel products, including wire nails and shoe nails, and such castings and forgings as cast iron railway car wheels, steel railway car wheels, railway car axles without wheels or fitted with wheels, iron and steel forgings of carbon steel and alloy, including stainless steel.

FPC Pipeline Authorizations

NATURAL GAS facilities entailing more than 4900 miles of pipeline were authorized in the first half of 1949 by the Federal Power Commission.

Size of the pipe involved ranged from 4½ inches up to 26 inches in diameter. Authorized facilities involve an estimated total cost for construction of $374,820,900.

Senate Approves Research

SENATE approval of a $311 million expansion in defense research projects calls for construction of 22 wind-tunnels for testing modern super-speed aircraft and supersonic missiles. Most of these would be located at outstanding engineering institutions; two would be built at a proposed new engineering research center to be constructed at a cost of $150 million in some western area.

Nationalization Still Gaining in Britain

Public acceptance increases in U.K., is strong but not growing in France, strong but waning in Western Germany, weak in Belgium

NATIONALIZATION of industry as an economic principle is gaining in public acceptance in Britain, strong but not gaining in France, strong but losing in Western Germany and weak in Belgium.

Another economic area which the British government proposes to enter is mineral resources. The administration views favorably a Mineral Development Committee's recommendation that ownership of all but coal, oil, bedded iron ore and some other minerals of wide occurrence be transferred to the public. Coal is already nationalized, and most bedded iron ore would become public property should the steel industry be taken over by the government. Steel's fate will be decided finally in the 1950 general election, probably next August.

French legislature has shelved temporarily all industry nationalization proposals, including one for steel. Encouraging sign for free enterprise proponents is formation of Societe Lorraine de Laminage Continu (commonly called SOLLAC) under private management. It will be one of the largest steel producers in France.

Victory of right-wing parties in Western Germany's parliamentary elections is a blow to the trade union's program for public ownership of industry. Christian Democrats and the parallel Free Democrats, both against nationalization, lack only 11 seats of having a majority of the 402 parliamentary places. They can probably pick these up by linking with small splinter anti-socialist groups.

Industry in Belgium-Luxemburg operates under less goverment control than it does in any other major nation of Europe. Export trade and prices are controlled, however, and metalworking companies must accept a few allocations regulations on imported products like iron ore.

Nationalization Defended

Labor government has replied to Winston Churchill's charge that "every major industry which the socialists nationalized, without exception, has passed from the profitable, or self-supporting side to the loss-making debit side."

Labor says that civil aviation is the only industry in Britain now operating at a loss and receiving a government subsidy. Coal, the cable and wireless industry and Bank of England, are all on a profitable basis. Gas and electricity have not been nationalized long enough for any evidence of losses or profits to "be available to Mr. Churchill or anybody else." Railroads, the government admitted, are operating at a loss, as they were before the war. They would have been bankrupt if left in private hands; the government had to take over.

In addition to its nationalization recommendations, the Mineral Development Committee finds that the United Kingdom has over 50 years' supply of china clay, gypsum, anhydrite, fuller's earth, ball clay and salt. There is only a ten-to-twenty years' supply of hematite iron, barytes, witherite and fluorspar. The exploration of potash deposits in Yorkshire should be pressed by the state. Lead, zinc and wolfram reserves are negligible. Tin mining in the Carn Brea district of Cornwall should be encouraged by the government.

Productivity in British industries is rising. Government figures, taking the 1946 year as 100, show that efficiency in cement last February was 151, glass 143, metals engineering and vehicles 138, chemicals 133, textiles 139, clothing 133, foods 117, gas and electricity 127 and building 125. This index is actually a production indicator, but it can serve as a productivity gage too because employment in these industries has remained nearly constant since 1946.

Four methods of boosting productivity are revealed by a British delegation of construction experts touring the United States: 1. U. K. construction firms make greater use of incentive payment plans than do U.S. counterparts. 2. Professional, independent "quantity surveyors" take the guesswork out of bidding. These intermediaries between architects and builders make precise estimates of the quantity of materials needed. This information is supplied to all contractors wishing to bid. 3. Britain enjoys a national building code which simplifies construction. 4. A government agency studies construction cost-saving techniques; its findings are available to anyone.

French Shelve Plans

French nationalized industries include electricity, railroads, airlines, aircraft and certain individual companies in other fields, notably the Reynault auto firm.

Chances for public ownership of steel now appear slight, particularly after formation of the independent SOLLAC. Its facility expansion is progressing, and an 80-inch hot strip mill will be installed in northern

UNITED Engineering & Foundry Co. will build an 80-inch hot strip mill for SOLLAC, a new French steel company. K. C. Gardner, left, president of United, and J. M. Misset, assistant to the president of SOLLAC, watch as Raymond Colmant, director of the French firm, signs the contract

France within 20 months (See STEEL, July 4, p. 40, for details). Three Pittsburgh companies have signed contracts to build nearly $50 million worth of machinery. United Engineering & Foundry Co. will construct an 80-inch hot strip mill, Mesta Machine Co. a cold strip unit and Westinghouse Electric Corp. the electrical equipment to run both.

German Conservatives Win

Nationalization in Western Germany will be stalemated until at least the next election. The Social Democrats, in favor of public ownership, won only 131 of 402 seats. Coalition on this issue would be conceivable with only the Communists, who got 15 seats.

Production of steel ingots and castings climbed to 874,332 net tons in July, against 843,862 tons in June. Present steel output of the Ruhr is 49.5 per cent of 1938. In the Dortmund area production is 67.9 per cent of 1938. Steel exports for the 12 months beginning July 1, 1949, are limited to 275,000 tons. Between 2 million and 4 million tons of steel and steel products were exported before the war.

German scrap exporters are elated by a contract with Britain providing for 600,000 tons of scrap to be exported in monthly amounts of 120,000 tons to the end of the year. The contract price is $24 per metric ton f.a.s. Official export quotation is $28.50. Exports to America are dwindling to nothing.

U.S. Gets Russian Manganese

RUSSIA has resumed manganese ore shipments to the United States after a lapse of two months.

Commerce Department reveals that $100,000 worth of this ore was imported from the U. S. S. R. in June, compared with $600,000 imported in March, 1949, the last previous shipment. In 1948, the U.S. imported $800,000 worth monthly of this item from the Soviet.

Total imports from all sources of ferroalloying ores in June are valued at $4.6 million, compared with $4.7 million in May. Imports of nonferrous ores and concentrates are valued at $20.8 million in June, against $24.8 million in May.

ECA To License Under Plan

UNDER a voluntary allocations plan covering steel for countries in the ECA program, ECA will license for export to those countries steel plates, galvanized sheets, hot and cold-rolled sheets, electrical sheets, and hot and cold-rolled strip.

Short Shipping Season

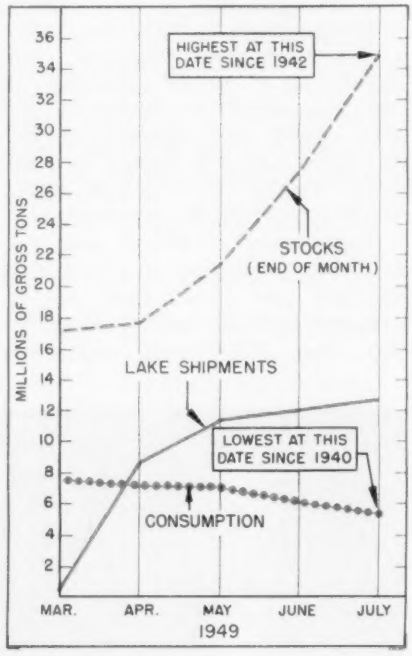
Earliest closing in decade expected as iron ore piles up at lower lake docks and furnaces

EARLIEST voluntary closing of Great Lakes iron ore shipping in ten years is in prospect for this season as a result of reduced needs of the iron and steel industry.

Some vessels already have been tied up; decisions about how long others will run will be made in the next several weeks. Need for taking the risk of operating in hazardous December weather has practically vanished, and the necessity for operating in late November is shrinking.

In only one year since 1938 has the lakes ore shipping season closed in November. That was in 1944 when weather prevented operations in December.

Iron Ore Stocks Piling Up



Shipments Heavy—The early layup of vessels does not result entirely from declining ore needs of the iron and steel industry, however. Much of it is due to the heavy rate at which the lakes fleet moved ore thus far this season, and an unusually early opening of navigation last spring.

Combination of a big movement of ore and shrinking needs is shoving stocks up sharply, as is indicated in the accompanying chart, and is removing the fear of insufficient carryover for next spring. In fact the growing stockpiles are making some consumers conscious of the physical limits of their storage capacities. At the end of July, ore on hand at furnaces in the United States and Canada and at Lake Erie docks in the United States was an estimated 34,905,000 gross tons, greatest for that date since 1942. Meanwhile, ore consumption, which had been falling since a peacetime high of 7,734,760 gross tons in March, ebbed to an estimated 5,558,000 gross tons in July, lowest for that month since 1940.

The rate of ore movement has been so heavy that through July this season's shipments, aggregating 45,953,288 gross tons, exceeded those for the corresponding period of all years except the war year of 1942. Cumulative shipments last year to Aug. 1 were 42,834,915 gross tons. July movement of 12,767,718 gross tons was the biggest for that month since 1944.

Watch Labor News—Putting a big question mark over the needs for ore and its movement the rest of this season is the threat of a steel workers' strike. If there is no strike, the large consumers of steel would start working off inventories they have built as protection against a strike and steel production would decline, say some observers. On the other hand a strike, they point out, would halt the movement as well as consumption of ore and perhaps make late season navigation necessary again to build sufficient stocks for next spring.

Until the strike problem is resolved, steel companies and vessel operators will find difficulty in making clearcut decisions as to needs of ore and its movement. One steel company thinks its ore requirements this year will be 15 per cent less than that of last year, and an ore company reveals some consumers have indicated they will need 10 per cent less. This ore company expects the necessity of curtailing its underground mine production in the coming winter.

Coal Shipments Lower — Helping speed the movement of ore this summer has been a reduction of lakes shipment of coal, resulting in a faster turn-around time for the freighters carrying ore down the lakes.

Laying up of some of the ore carriers is making them available early for storage of a heavy grain crop. In the last two weeks Cleveland Cliffs Iron Co., Cleveland, has tied up five small vessels at Buffalo where they will be used as grain storage, and Interlake Steamship Co., Cleveland, was preparing to tie up eight or ten boats, one already having been set aside for grain storage.

Refractory Needs High

Blast furnace relining jobs temporarily make up for declining open-hearth requirements

ECONOMIC roof is holding up well for refractories makers, but a few spots are showing wear.

Steel rate decline from peak capacity levels has cut the need for open-hearth furnace maintenance, which is the major source for refractory demand. Thus far new blast furnace relining jobs have offset most of this reduction. Companies like Republic Steel Corp., which soon will reline two units in Youngstown and one in Buffalo, are taking advantage of the first slackening in demand for pig iron since before the war to recondition their equipment. On July 1, 44 U. S. and two Canadian furnaces were idle out of a total 195, compared with 14 U. S. and Canadian units down July 1, 1948. Many blast furnaces have not been relined in ten years, considered the maximum life for one lining. Average life is six to seven years.

Eventual Drop Seen—Refractory makers anticipate an eventual fall in fire brick requirements for the steel industry, their largest customer, once the blast furnaces are put on a normal relining schedule. High consumption of refractories during and since the war was caused both by abnormally high operating rates and by uneconomic use of equipment when production meant everything. Steel's inventory position for refractories has already resumed a prewar pattern. Only material needed immediately is on hand since refractory makers can deliver quickly.

The construction industry, another good customer, is also beginning to need less refractories. Although construction is proceeding at a record pace, much of it is small industrial plants, commercial buildings and homes which don't need refractories. Development of water tube side walls eliminates refractory needs in boilers for industrial power plants.

Bottom-Up Management

ONE criticism of the modern industrial establishment is that too many workers tend to become mere cogs in the machine. Initiative and responsibility flow down from the top. The individual worker finds it easy to do what he is told to do and little more. Often, he feels constricted by this system and his value to his employer is limited.

William B. Given Jr., president, American Brake Shoe Co., suggests an answer to this criticism in *Bottom-Up Management*, published by Harper Brothers. Bottom-up management is a philosophy which the author has practiced in his own company for the past 30 years. Under this concept of people working together, the head of a business tries to release the thinking and encourage the initiative of all those down the line, so that ideas and impetus flow from the bottom up, and the entire organization contributes as fully as possible to the progress and profits of the enterprise. By enlisting the support and creative contributions of supervisory and rank and file employees, management encourages a firmer sense of partnership. Efficiency increases, costs often are reduced, products and methods of production improved.

"Until recent years," says Mr. Given, "emphasis was placed on the techniques of management. Lately business men have come to realize that the success and progress of an enterprise is the sum-total of the success and progress of its people. The management which fails to stimulate their wholehearted interest and loyalty, and fully utilize their ideas and initiative—as well as their time and energy and skill—is short-changing itself, its stockholders, and the public it serves."

Industry Uses More Movies

INDUSTRY is taking a cue from the Army and is using more training films.

Films are available for sale or rent in every large U. S. city on sales training, office practice, executive training, supervisory training, manual skills, electronics, materials handling, time and motion study, quality control, safety and health. Cost of renting from a library ranges from $1 to $15; the average is $5. To purchase a print outright, cost varies from $25 to $150, but a short technical film seldom exceeds $50. Cost of having a movie made for individual needs runs from $5000 to $125,000.

Many firms have set up a weekly schedule, showing 15 to 45-minute films on company time. In a survey of 26 Cleveland companies as to effectiveness of films, 20 termed them "excellent," five thought them "fairly good," one was dissatisfied.

New York Biggest Industry Area

THE 16-county New York and northeastern New Jersey area is the largest manufacturing center in the U. S. according to value added by manufacture, Census Bureau says.

CALENDAR OF MEETINGS

Aug. 23-26, American Institute of Electrical Engineers: Pacific general meeting, Fairmont Hotel, San Francisco. Headquarters are at 33 W. 39th St., New York 18.

Sept. 9-12, Instrument Society of America: Clinic on maintenance of industrial instruments, Hotel Statler, St. Louis. Society headquarters are at 921 Ridge Ave., Pittsburgh.

Sept. 12-16, Instrument Society of America: National conference and exhibit, Municipal Auditorium, St. Louis. Society headquarters are at 921 Ridge Ave., Pittsburgh.

Sept. 12-16, National Association of Corrosion Engineers: Short course in corrosion at University of Texas, Austin. Association headquarters are at 919 Milam Bldg., Houston.

Sept. 14-16, Porcelain Enamel Institute: 11th annual forum, Ohio State University, Columbus, O. Institute headquarters are at 1010 Vermont Ave. N.W., Washington.

Sept. 15-16, Associated Industries of Cleveland: Fall clinic on industrial relations, Carter Hotel, Cleveland. Group's headquarters are in the N.B.C. Bldg., Cleveland.

Sept. 21-24, National Association of Foremen: 26th convention, Hotel Statler and Masonic Temple, Detroit. Association headquarters are at 321 W. First St., Dayton, O.

Sept. 25-Oct. 1, American Institute of Mining & Metallurgical Engineers: Midyear meeting, Neil House, Columbus, O. Details may be obtained from J. H. Melvin, Orton Hall, Ohio State University, Columbus, O.

Sept. 26-28, National Electronics Conference: 1949 conference and exhibit sponsored by Illinois Institute of Technology, Edgewater Beach Hotel, Chicago. Nathan Cohn, Room 1505, 307 N. Michigan Ave., Chicago, heads the exhibit committee.

Sept. 26-28, American Mining Congress: Metal Mining Convention, Spokane, Wash. Congress headquarters are in the Ring Bldg., Washington.

Sept. 29, American Iron & Steel Institute: Regional technical meeting, Hotel Statler, Buffalo.

Oct. 3-4, National Association of Corrosion Engineers: South central regional meeting, Adolphus Hotel, Dallas. Heading the arrangement committee is G. R. Olson, United Gas Pipe Line Co., Shreveport, La.

Oct. 3-5, American Coke & Coal Chemicals Institute: Annual meeting, Skytop Lodge, Skytop, Pa. Institute headquarters are at 129 15th St., Washington.

Oct. 3-6, Association of Iron & Steel Engineers: Annual convention, William Penn Hotel, Pittsburgh. Association headquarters are at 1010 Empire Bldg., Pittsburgh.

Oct. 4-6, Society of Industrial Packaging & Materials Handling Engineers: Fourth annual exposition, Detroit.

Oct. 6, American Iron & Steel Institute: Regional technical meeting, Drake Hotel, Chicago.

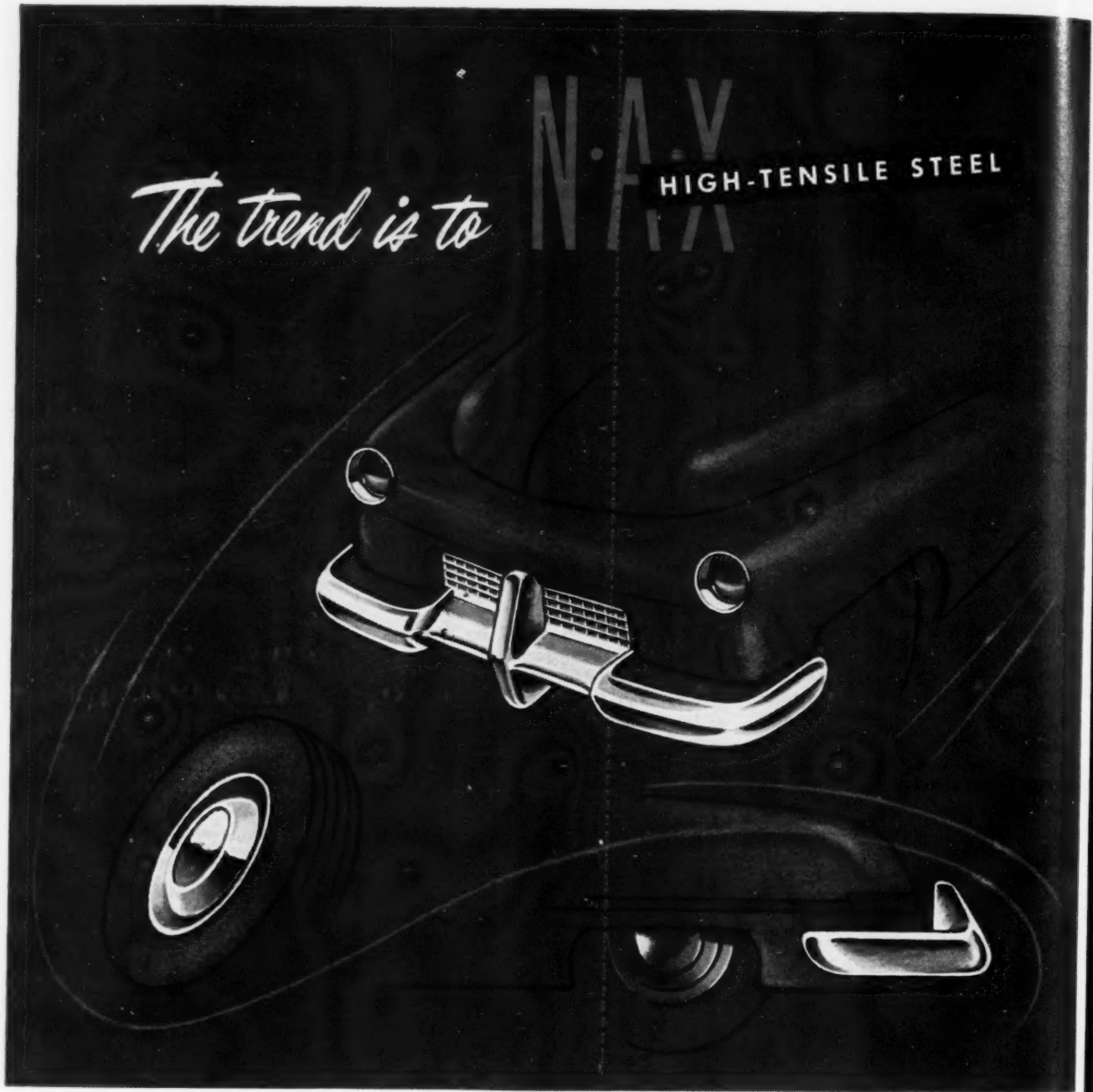
Oct. 10-14, American Society for Testing Materials: First Pacific area national meeting, Fairmont Hotel, San Francisco. National headquarters are at 1916 Race St., Philadelphia.

Oct. 11-14, American Standards Association: 31st annual meeting, Waldorf-Astoria Hotel, New York. Association headquarters are at 70 E. 45th St., New York.

Oct. 12-15, Electrochemical Society: 96th convention, La Salle Hotel, Chicago. Details may be obtained from H. B. Linford, secretary of the society.

Oct. 13-15, Industrial Management Conference of the University of Missouri: Third annual meeting, University of Missouri, Columbia, Mo.

Oct. 14-15, American Institute of Mining & Metallurgical Engineers: Annual fall meeting, Southern Ohio Section of Open Hearth Committee, Deshler-Wallick Hotel, Columbus, O. Institute headquarters are at 29 W. 39th St., New York.



Since 1940, when Great Lakes Steel pioneered the application of high-tensile, low-alloy steel to cold-stamped automobile bumpers, there has been a growing trend to N-A-X HIGH-TENSILE steel in the automobile industry.

Today, every car manufacturer is using the inherent better properties of N-A-X HIGH-TENSILE steel for some part of his automobile.

Bumpers and grilles—hoods and fenders—body panels and deck lids—frames and bracings—wheels and hub caps represent a few of many applications of N-A-X HIGH-TENSILE steel to the modern car.

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N-A-X HIGH-TENSILE MEETS ALL REQUIREMENTS OF S.A.E. 950

GREAT LAKES STEEL CORPORATION N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
Unit of National Steel Corporation

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Studebaker 1950 models offer complete change in frontal appearance and fender treatment. Riding and handling improved by self-stabilizing coil spring front suspension

DETROIT

LIKELY to cause as much of a stir as did its original "Which way is it going" design is the new airplane-motif of the 1950 Studebaker styling. A complete change in frontal appearance and fender treatment gives the new models a sleek look and the effect of being in motion even when standing still.

Both ride and handling ease have been considerably bettered by engineering innovations complementing the use of an improved self-stabilizing coil spring front suspension.

The front of the car is particularly striking. It embodies an airplane fuselage-type hood, flanked by air-foil front fenders and set off by a chrome "spinner." In addition to providing an ornamental touch, the "spinner" augments four frontal openings which direct air to the engine for maximum cooling. The largest of these air passages consists of two oval-shaped honeycomb grille scoops located below the two smaller air channels which flank the "spinner." Chrome moldings over these small twin channels contribute to the unusual decorative effect.

Heavy wrap-around bumpers are held by supports enclosed within tubular housings which are painted to match the automobile.

In keeping with the new speed lines are redesigned rear fenders, also air-foil type, and the large vertical tail lights which fit into the trailing edge of the fenders. Both front and rear fenders are the bolt-on type.

Wheelbases Longer — The wheelbases of all models have been increased by one inch. Overall lengths of cars are: Champion, 197¼ inches, Commander, 207⅞ inches and Land Cruiser, 211⅞ inches.

Instrument panels are located about 4 inches farther forward than previously, thus providing additional space in the front compartment. Control switches are of the push-pull type. Gages are grouped directly in front of the driver so that they can be checked at a glance.

The steering column is enclosed in an oversize steel jacket. Outside door handles are a new design and retain the pull-type action.

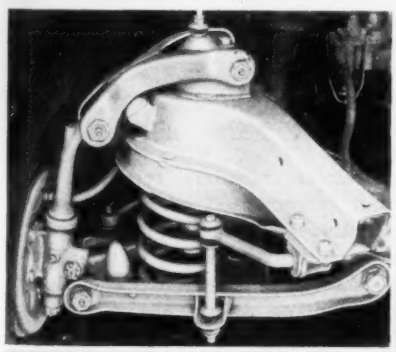
An unusual feature of the coil spring front suspension lies in the fact that both upper and lower control arms are pivoted so that they rake to the rear about 15 degrees. This has the effect of cushioning the ride on rough roads since the front wheels "travel away" from a bump as the car is driven over it. Rubber insulation is used at the top and bottom of each coil spring. Shock absorbers on the Champion are the direct-acting tubular type while the Commander utilizes the double-acting link-and-lever variety.

Compression Higher—Engines in both the Champion and Commander have a new compression ratio of 7.0 to 1, and for high altitudes only, a ratio of 7.5 to 1 is available. Commander engine horsepower has been increased to 102 at 3200 revolutions per minute while the Champion has been raised to 85 horsepower at 4000 revolutions per minute.

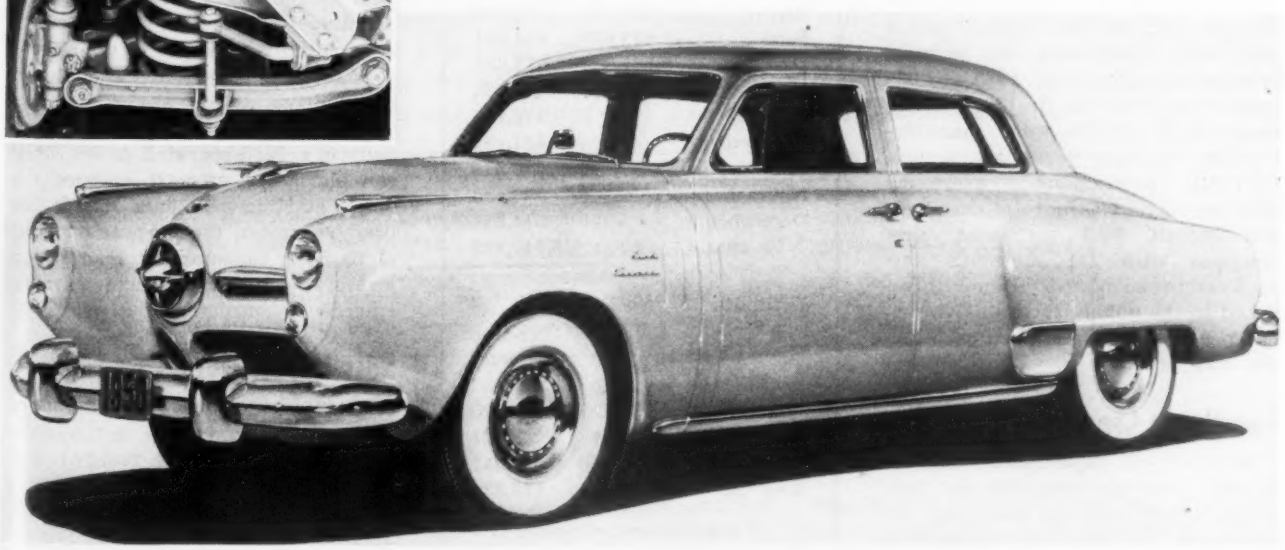
A new distributor with an integral vacuum spark modifier is a feature of the 1950 Commander ignition system. Motor mounts are redesigned and contain an increased amount of rubber for reduced vibration.

In redesigning the frame to accommodate springing changes, Studebaker has relocated the five cross members in order to provide greater strength. One of the rear members is utilized as a support for the top connection of the rear shock absorbers which are mounted "sea leg" fashion for control of side sway in addition to the usual control of up-and-down movement of the springs.

Confirming the fact it will manufacture a new type of automatic



AIR FOIL fenders and airplane fuselage style hood set off by a chrome "spinner" figure prominently in the 1950 Studebaker. Shown here is the Land Cruiser, designed by Raymond Loewy Associates. Closeup of the new front suspension in the 1950 Studebaker Champion, at the left, shows the shock absorber mounted within the coil spring. Rubber-mounted front stabilizer bar is attached to frame and to both lower control arms which are pivoted so that they rake to the rear about 15 degrees



transmission using a torque converter and providing the equivalent of four speeds or overdrive, the Detroit Gear Division of Borg-Warner Corp. announces preparations for production are under way in a newly-acquired plant on East Seven-Mile road near Outer Drive in Detroit. Studebaker will be the first buyer of the unit, although it is expected later other independent car builders may adopt the device. Howard E. Blood, president of both the Norge and Detroit Gear Divisions of B-W, has been made chairman of the board of Norge so he can devote more time to the new transmission project.

New Test Hill for Ford

A NEW test hill has been placed in operation at the Ford test track in Dearborn. The new man-made hill, erected on level surfaces of the former Ford airport, consists of a 17 per cent grade and a 30 per cent grade. The latter approximates the Filbert street grade in San Francisco which long has been a favorite among test engineers.

To construct the hill, 116,000 tons of slag were moved to the test track from the company's Rouge steel mills. After being allowed to settle for nearly a year, the hill was paved with a 24-foot ribbon of reinforced concrete and protected by six-foot steel guard rails. The sides of the test hill have been landscaped and planted with honeysuckle to keep the topsoil from washing away during rainstorms.

The new hill is now used by Ford engineers testing automatic transmissions, foot and hand brakes, bumper clearances, hill-climbing ability, carburetion, clutch operation and other measurements.

Oldsmobile Output Up 52%

PRODUCTION of Oldsmobiles is now running 52.2 per cent higher than a year ago. Comparing last month's production with July, 1948, 27,029 units were built in the 20 working days, while 17,758 were manufactured in the same period a year ago. Currently production is averaging 1351 per day. Of the total cars built last month, 63.3 per cent were equipped with the division's new high-compression V-8 engine introduced to the public last fall. Ninety-one per cent were equipped with Hydra-matic drive.

Everybody Can Ride

THE ENTIRE population of the U. S. now could go riding at one time, since there is now one passenger car registered for each 4.8 persons in the country. (That would unfortunately leave no one to pump the gas.) Total passenger car, motor truck and bus registrations exceed 41 million units, three times the combined total of the rest of the world. Since the war, ownership of motor vehicles has increased by more than 10.5 million.

Four-Door Models Lead

SINCE the end of the war, four-door sedans have replaced two-doors as the largest volume style in new car production. The trend continued in 1948 when for the first time more than half of all new passenger cars were four-door models. Prior to the war, four-doors consistently accounted for 40 per cent of each year's total.

Autos Run Further, Longer

ACCORDING to *Automobile Facts and Figures*, the average vehicle in 1925 had accumulated 25,740 miles when it was retired at the age of 6.5 years; by 1947 it went to the scrap heap only after it had run 103,000 miles in its 12.25 years of life. Of the passenger cars in use last year, 42 per cent were ten or more years old.

Road Costs Reached Peak

HIGHWAY and street construction last year was 82 per cent of the 1939 level and only 55 per cent of the volume averaged in the nation's peak roadbuilding period of 1930-31. In dollars spent, however 1948 exceeded even the $1.5 billion peak of 1930 and was far ahead of the $901 million spent in 1939. Total road and street costs last year, including maintenance, administration costs and debt interest, reached a new peak of nearly $3.1 billion.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

	1949	1948
January	445,092	422,236
February	443,734	399,471
March	543,711	519,154
April	569,728	462,323
May	508,101	359,996
June	623,689	454,401
Six mos.	3,134,055	2,617,581
July	605,000*	489,736
August		478,186
September		437,181
October		516,814
November		495,488
December		514,337
12 mos.		5,549,323

*Preliminary.

Estimate for week ended:

	1949	(Same week) 1948
July 30	138,727	113,270
Aug. 6	142,718	108,864
Aug. 13	144,078	112,342
Aug. 20	148,000	113,324

Estimates by Ward's Automotive Reports

Device To Control Auto Fumes

SMALL device to eliminate obnoxious automotive fumes has been developed by Erwin H. Waldman, Los Angeles.

The "exhaust oxidizer" is designed to insert between the exhaust manifold and the motor end of the exhaust line on automobile engines. Its purpose is to inject controlled amounts of air to the exhaust line at this point. By so doing, it furthers more complete combustion and reduces the amount of unburned products which pass out the exhaust tail pipe.

Four-Wheel Drive Passenger Car

FIRST production-line passenger car with four-wheel drive is now being built by Willys-Overland Motors, Toledo, O.

The Willys station wagon is the first to be so equipped. It is equipped with the selective two and four-wheel drive which brought fame to the rugged military Jeep.

Originally built on a special order for the U. S. Army, the station wagon was made available to the civilian market for motorists whose needs or inclinations take them off the beaten track. Loaded to its half ton capacity, the new vehicle has a 59 per cent gradeability.

Willys-Overland officials expect widest interest will be shown by sportsmen, ranchers, foresters, rural mail carriers and construction men. All-steel body of the station wagon is essentially the same in appearance as Willys-Overland conventional two-wheel drive station wagon.

Another development by the company is a Jeep-operated device which can shock jet aircraft engines into quick starting. It is a mobile aircraft energizer, the purpose of which is to take the starting load of the aircraft's batteries to save them for emergency purposes.

Soss Boosts Output on Hinges

SOSS Mfg. Co. has stepped up production of hinges for automobiles, furniture and general building purposes 20 per cent through addition of a second eight-hour shift to daily operations. Soss is located in Detroit.

STAINLESS BARS

And Every Other Kind of Bar . . . *Fast*

For your convenience wherever you are, large and diversified bar stocks are maintained in thirteen great Ryerson plants. In Allegheny Stainless bars alone these stocks include several different kinds—in a comprehensive range of shapes and sizes. Rounds, squares, flats, hexagons and angles are on hand in the exact analyses to meet your particular service conditions or required fabricating characteristics.

Ryerson provides expert technical assistance in selecting the kind of bar best suited to your special needs. The recommendations of Ryerson specialists are backed by more than a century of practical experience.

Whether your requirements call for carbon, alloy, or stainless, hot rolled, cold finished or heat treated, Ryerson usually has the right bar in stock for immediate shipment. For every bar requirement, contact your nearby Ryerson plant.

PRINCIPAL PRODUCTS

BARS—Carbon & alloy, hot rolled & cold finished
STRUCTURALS—Channels, angles, beams, etc.
TUBING—Seamless & welded mechanical & boiler tubes
STAINLESS—Allegheny metal plates, sheets, bars, welding electrodes, etc.
PLATES—Sheared & U. M., Inland 4-Way Floor Plate
SHEETS—Hot & cold rolled, many types & coatings
MACHINERY & TOOLS—For metal working

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • DETROIT • CINCINNATI
CLEVELAND • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

Baldwin Coal Locomotive

Designed to cut fuel cost 50 per cent. Westinghouse and Babcock & Wilcox collaborating

NEW type of coal-burning, steam-turbine, electric-drive locomotive designed to slash fuel costs 50 per cent compared with conventional steam units is being built by Baldwin Locomotive Works in collaboration with Westinghouse Electric Corp. and Babcock & Wilcox Co. It will be used by Norfolk & Western Railway for freight service.

Marvin W. Smith, Baldwin president, says that while the new turbine would not change the present trend to diesel power "it would supply more efficiently the requirements of those railroads which are concerned with the transportation and use of coal."

Babcock & Wilcox will build the boiler, and Westinghouse will supply the steam turbine generator, traction motors and all electrical control equipment. Baldwin will design and build running gear, cab tender and other mechanical parts and will be responsible for final assembly.

Allegheny Develops TV Alloy

ALLEGHENY Ludlum Steel Corp. has developed a steel alloy that may reduce the cost of television sets.

The new steel—Telemet—will be used to make the cone section of television picture tubes. Picture tubes made of glass welded in a vacuum seal to Telemet will be cheaper, lighter and less fragile than the conventional all-glass units, says Russell M. Allen, Allegheny Ludlum vice president. Important property of the alloy—whose formula is a secret—is that it has the same rate of expansion and contraction as glass.

Material's other applications, where it is desirable to fuse glass and steel, include auto headlights, glass door knobs and window panes.

New Air System in England

LOW-PRESSURE air conveying system will be introduced in England by Convair Corp., Pittsburgh. The Convair system, developed in the past four years, will be a feature of the $500,000 plant of Jackson Brothers Ltd., major British bottle manufacturers of Knottingly, England.

SALES ON WHEELS: Unique type of punch press of 30 tons rated capacity, this Diamond Multi-Max Punch Press is being demonstrated to dealers and potential customers on a truck. Mobile exhibit also consists of a 9-ton bench press and a milling machine

Ex-Cell-O Celebrates 30th Year

FROM the second floor of a small two-story building in Detroit in 1919 Ex-Cell-O Corp. has expanded its tool-building facilities into 829,157 sq ft. Celebrating its 30th anniversary this year, the company—originally incorporated as Ex-Cell-O Tool & Mfg. Co.—now does business with the aircraft, railroad, textile and food packaging industries and with other machine tool builders.

Five of the original shareholders, Phil Huber, George Buffington, Ed Hopson, Charles Benker and J. Harry Palmer, are active in the company's service. Acquiring Robbins Engineering Co., Detroit, last year, Ex-Cell-O has managed since to double the number of Robbins employees.

"Ex-Cell-O in the Land of Opportunity" is the title of a new book commemorating the 30th year of the company.

Balmar Takes Over Strand

BALMAR Corp., Baltimore, which acquired the business of N. A. Strand & Co., Chicago, will transfer equipment to its Baltimore property next month. The Baltimore plant is being altered to provide space for additional equipment. Strand made flexible shafts, grinders and screwdriving machines which will be added to Balmar's line. New division will be known as the N. A. Strand & Co. Division. Balmar is a subsidiary of Franklin Railway Supply Co., New York.

Rights for Electric Igniter

APPROVAL of the Whiting-Mason Electric Coke Igniter is greatest in communities where smoke nuisance ordinances are being enforced.

Whiting Corp., Harvey, Ill., has obtained manufacturing and sales rights for the device which eliminates odor and smoke for burning-in the cupola coke bed. It does not use wood, gas or oil. Small foundries can get hot iron on the first tap; large foundries save money through speed of ignition.

Diesel Locomotives on Railway

EAGLE MOUNTAIN Railroad of California now operates two Baldwin 1500-hp diesel-electric locomotives on its tracks, hauling ore from the Eagle Mountain mine to Kaiser Steel Corp.'s plant at Fontana, Calif. The 164-mile haul between Eagle Mountain and Fontana provides the Kaiser plant with one of the shortest rail movements for its iron ore of any large steel plant in the U. S. It was built and is owned by Kaiser.

Proctor Building Arbutus Plant

PROCTOR Electric Co.'s Metal Division is building its 50,000-sq ft plant on Pistorio Rd., Arbutus, Md. The company produces a single piece, all-metal ironing board. Home offices are in Philadelphia.

Addition to New Warehouse

BLACK & DECKER Mfg. Co., Towson, Md., manufacturer of portable electric tools, has started erection of a 34,400-sq ft addition to its warehouse, completed last year.

UNIVERSITY OF MICHIGAN LIBRARIES

Briefs . . . .

Paragraphs on developments of interest and significance within the metalworking industry

Parker Appliance Co. has appointed Nielsen Hydraulic Equipment Co. distributor for O-rings manufactured by the Cleveland firm. Nielsen will stock parts and offer engineering service on O-rings for sealing hydraulic and other fluid-handling systems in metropolitan New York.

—o—

United Helicopters Inc., Palo Alto, Calif., has appointed Helicopter Utilities Inc. distributor for the Hiller 360 helicopter for eastern New York, New Jersey and western Connecticut. Agency is in White Plains, N. Y.

—o—

L. S. Starrett Co., Athol, Mass., has purchased Burrill Saw and Tool Works, Ilion, N. Y., manufacturer of Paramount band knives and band saws. These products are being manufactured by Starrett and marketed by Starrett distributors under that name.

—o—

Maury I. Cohen Co. is the name of a new firm formed by Mr. Cohen, president of National Association of Steel Exporters Inc. and chairman of National Affairs Committee of Association of Steel Distributors. Principal office is a 150 Broadway, New York.

—o—

Henger-Seltzer Co., Los Angeles, has been appointed West Coast sales distributor for a number of products manufactured by Fansteel Metallurgical Corp., North Chicago, Ill., and its subsidiary, Weiger Weed & Co., Detroit.

—o—

American Machine & Foundry Co. has obtained exclusive selling rights in the U. S. to textile machinery manufactured by Titan Ltd., Copenhagen, Denmark.

—o—

Lovins Engineering Co., product engineering, instrumentation consulting and technical sales firm, has been opened at 8616 Georgia Ave., Silver Springs, Md.

—o—

Thomas Steel Co., Warren, O., manufacturer of cold-rolled strip steel specialties marketed under trade name of Thomas Strip, has appointed California Cold Rolled Steel Corp., Los Angeles, western distributor.

—o—

General Motors Technical Center's 320-acre site at Mound and Twelve-Mile roads, north of Detroit, is being excavated. Work has begun on the engineering group buildings, expected to be ready for occupancy by late summer of 1950. Later this summer excavation will begin for research laboratories group buildings. Technical center will include research, engineering staff, process and styling operations of GM.

—o—

Process Engineering department of Detrex Corp., Detroit, will be headed by George W. Pew. The newly created department will handle engineering requirements other than product design for the degreasing and alkali cleaning compounds firm.

—o—

First postwar shipments of tungsten and manganese from Korea have arrived in San Francisco. Consignments included 50 tons of tungsten scheelite ore and 55 tons of ferromanganese.

—o—

Heil Process Equipment Corp., Cleveland, has appointed W. P. Wooldridge Co. as sales representative in California with offices at 1060 Howard St., San Francisco. Heil makes lined pipe ducts, impervious graphite heating and cooling units, etc.

—o—

Nicholson File Co.'s Walter R. Buerckel, who gives lectures on how to select and use the right file, illustrates his talk with slides. The Providence, R. I., company offers his services free. Mr. Buerckel makes selection and use of files simple enough for trainees to understand and technical enough to help experienced foremen and machinists.

—o—

Butterfield Division of Union Twist Drill Co., Derby Line, Vt., manufacturer of taps, dies, reamers and special cutting tools, appointed Bond Supply Co. distributor in Kalamazoo and Battle Creek, Mich. Bond maintains stores in Battle Creek and Kalamazoo.

—o—

Acme-Winter Corp. is the new name of Acme Pattern & Machine Co. which has been in business 44 years. The Buffalo company intends to announce new products and developments shortly.

—o—

Harry Ferguson Inc., Detroit, appointed Wylie-Stewart Machinery Co. of Oklahoma City, Okla., distributor for Ferguson System tractors and farm implements.

—o—

Amertool Engineering Service for Central Europe, organized two years ago by a group of American machine tool manufacturers, will be represented by Ralph Strang, through Stenzel & Co., Weisbaden, Germany.

—o—

Borg-Warner replacement parts will be distributed throughout Canada by B-W-H Service Parts Ltd., Merritton, Ont. B-W-H is arranging to take over Borg-Warner parts inventory of Acton Machine Co., Toronto.

—o—

Gordon Steel Co. has been established by Bernhard Gordon at 105 W. Adams St., Chicago. Mr. Gordon was associated for more than 20 years with Caine Steel Co. of Chicago. He has been active in steel distribution and warehousing in many capacities.

—o—

Scully-Jones & Co. appointed A. A. Gustavson, St. Paul, as its factory representative in Minnesota and Wisconsin counties of Eau Claire and Chippewa. The company also formed a Production Parts Division to be headed by J. Dudley Lockrem, vice president. Division was established to solve design and production problems of automotive and aircraft industries. Scully-Jones is in Chicago.

—o—

Bakelite Co. (Canada) Ltd. announces its new address as Box 395, Belleville, Ont.

—o—

American Home Laundry Manufacturers' Association is now the name of American Washer & Ironer Manufacturers' Association. Change was made to express the association's objectives more clearly by dropping all product identity in the title.

—o—

Standard Transformer Co., Warren, O., has appointed Rietze & Co., 139 S. Fifth St., Louisville, to handle Standard's line of transformers in Kentucky.

—o—

Marcus Transformer Co. Inc., Hillside, N. J., has appointed Edward K. Meyer Co., 714 16th Ave., Minneapolis, as a representative.

—o—

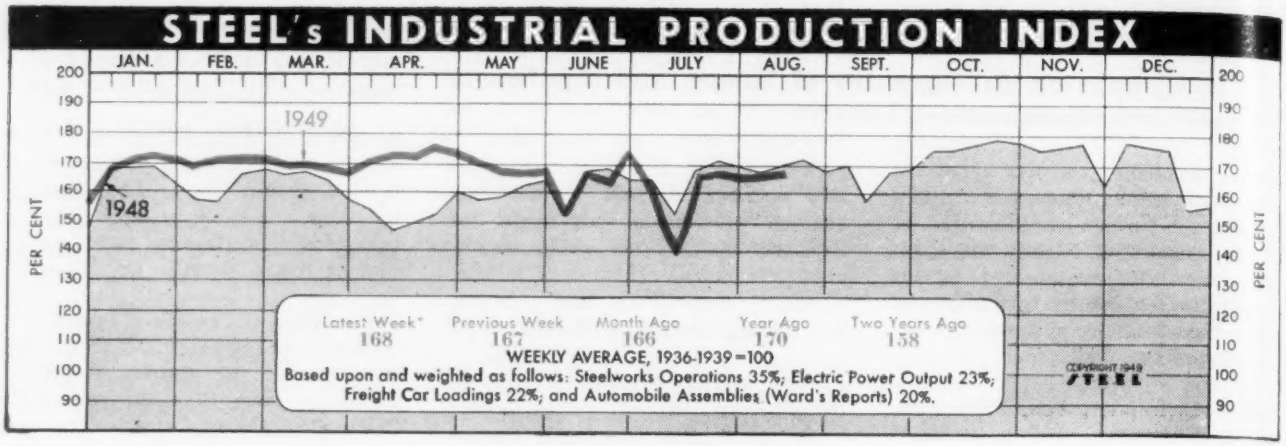
Fischer & Porter Co., Hatboro, Pa., will hold its next instrumentation course at its Hatboro plant Oct. 10 through 14. Course will cover manufacture, calibration, installation, operation and maintenance of "Flowrater" process control instruments.

—o—

Wiborg Mfg. Co. has moved its plant and offices to 3510 Ruston Way, Tacoma, Wash. Company fabricates steel cranes and trolleys.

—o—

Insulating Fabricators Inc., East Rutherford, N. J., is now a distributor of General Electric Texolite plastics surfacing materials.


STEEL's INDUSTRIAL PRODUCTION INDEX
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.
1949
1948
PER CENT
Latest Week* 168
Previous Week 167
Month Ago 166
Year Ago 170
Two Years Ago 158
WEEKLY AVERAGE, 1936-1939=100
Based upon and weighted as follows: Steelworks Operations 35%; Electric Power Output 23%; Freight Car Loadings 22%; and Automobile Assemblies (Ward's Reports) 20%.
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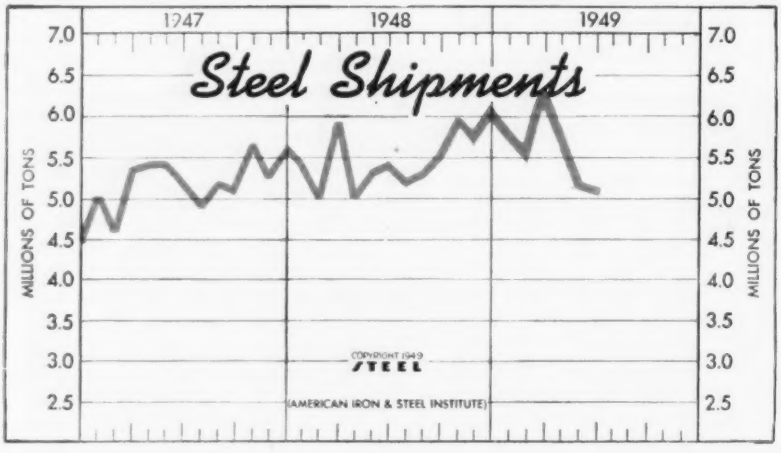
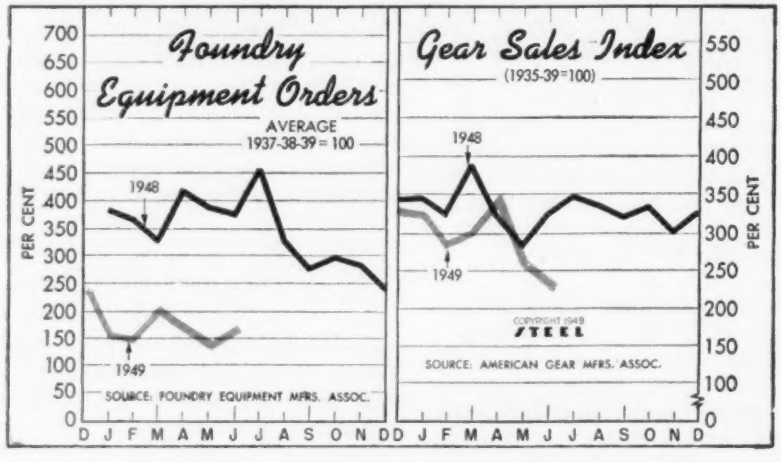
*Week ended Aug. 13 (preliminary).



Steel Shipments

(Net Tons)

	1949	1948	1947
Jan.	5,788,632	5,410,438	5,061,333
Feb.	5,519,938	5,046,115	4,626,424
Mar.	6,305,681	5,978,551	5,304,415
Apr.	5,596,786	5,096,161	5,445,993
May	5,234,862	5,321,375	5,442,343
June	5,177,259	5,476,774	5,263,711
July	.....	5,229,880	4,974,566
Aug.	.....	5,329,060	5,278,223
Sept.	.....	5,511,474	5,118,839
Oct.	.....	5,952,008	5,681,597
Nov.	.....	5,732,256	5,216,990
Dec.	.....	6,056,282	5,613,036


Foundry Equipment Orders
AVERAGE 1937-38-39=100
1948
1949
SOURCE: FOUNDRY EQUIPMENT MFRS. ASSOC.
Gear Sales Index
(1935-39=100)
1948
1949
COPYRIGHT 1949 STEEL
SOURCE: AMERICAN GEAR MFRS. ASSOC.
PER CENT
D J F M A M J J A S O N D D J F M A M J J A S O N D

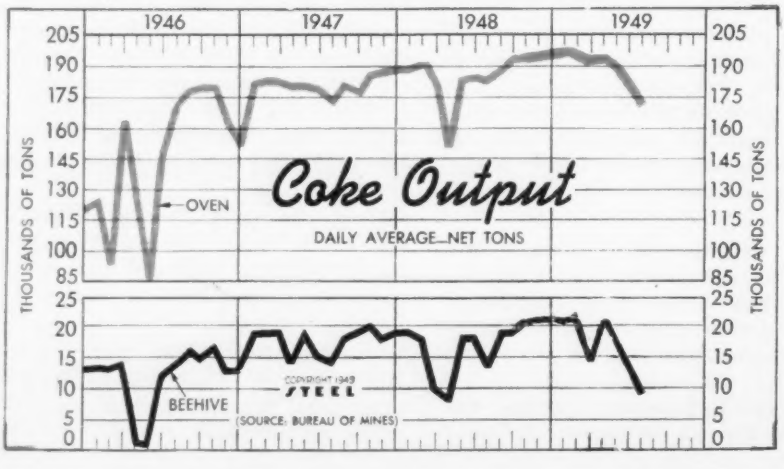
Foundry Equipment Orders*

	Index (1937-38-39=100) 1949	1948
Jan.	149.9	380.9
Feb.	144.4	367.3
Mar.	190.8	326.2
Apr.	172.0	412.0
May	121.9	388.5
June	164.9	376.8
July	....	456.3
Aug.	....	324.7
Sept.	....	273.5
Oct.	....	296.0
Nov.	....	284.4
Dec.	....	243.7

Gear Sales

	Index (1935-39=100) 1949	1948
Jan.	320.7	346.8
Feb.	282.3	324.4
Mar.	299.1	389.8
Apr.	339.0	320.9
May	250.1	283.6
June	227.8	324.1
July	....	348.4
Aug.	....	335.6
Sept.	....	320.4
Oct.	....	333.3
Nov.	....	309.0
Dec.	....	325.9

* By foundry trades only.



Coke Output

Bureau of Mines
(Daily Average Net Tons)

	Oven 1949	Oven 1948	Beehive 1949	Beehive 1948
Jan.	196,000	189,191	20,121	19,588
Feb.	195,551	190,098	22,261	18,625
Mar.	192,183	182,340	14,030	10,485
Apr.	192,019	149,692	21,098	8,235
May	187,040	184,568	17,017	18,651
June	174,748	187,200	8,887	18,700
July	.....	184,286	.....	14,032
Aug.	.....	188,468	.....	19,751
Sept.	.....	192,090	.....	19,616
Oct.	.....	192,440	.....	20,083
Nov.	.....	193,565	.....	20,341
Dec.	.....	195,670	.....	20,588
Ave.	.....	185,634	.....	17,391

The Business Trend

INDUSTRIAL activity in the week ended Aug. 13 was 1 point higher than in the preceding week with STEEL's industrial production index at 168 per cent of the 1936-1939 average. Although scattered bright spots have appeared in the metalworking picture in recent weeks, they have not as yet affected the basic industries used in computing the index. Current operations are still below those for the corresponding week last year.

AUTOMOBILES—Still the brightest spot in the metalworking picture and running well ahead of 1948 both on a week-to-week basis and in the annual total, the automobile industry continues to aim for higher production. Assemblies in the week ended Aug. 13 totaled 144,078 passenger cars and trucks, compared with 112,342 in the corresponding week last year. Despite this high production volume, assemblies for the week were below the schedules set for the industry. For the third consecutive week high temperatures and the resulting "heat walkouts" caused a number of builders to lose production time. These losses have dimmed the industry's chances for making August the top production month in history.

STEEL—Steelmaking operations continued their slow advance in the week ended Aug. 13 to 82.5 per cent of capacity, a 1 point rise over the preceding week. This marked the third consecutive increase in the weekly ingot rate and the current week's continues the slow climb. Although the rate of rise is much slower than was the rate of fall from the record levels attained in the first quarter of this year, the fact it is a steady rise is viewed as encouraging.

CONSTRUCTION—Civil engineering construction volume chalked up its second consecutive 1949 record in the week ended Aug. 11, when contract awards totaled $257.3 million, up $18 million over the preceding week. This volume was 30 per cent above the like week in 1948 but short of the postwar mark set in December, 1948. Private construction during the week totaled $135.7 million, 89 per cent above the corresponding week last year. Included were: Power plant construction, steelmaking furnaces, a gasoline plant, pipe line projects, etc. Heavy construction for the year to date totals about $5.1 billion.

POWER—Sales of electricity to large industrial consumers in June dropped 2.5 per cent below the level of a year ago even though total sales were higher by 3.9 per cent. Edison Electric Institute figures show total sales rose to more than 20 billion kwhr in June compared with 19.3 billion kwhr in June, 1948. Sales to large industrial customers dropped to 10 billion kwhr from 10.3 billion kwhr a year earlier.

COAL—Bituminous coal output in the week ended Aug. 6 continued at a reduced level because of the three-day work-week aggregating 7,550,000 net tons. Since the start of the three-day week on July 5, bituminous coal production has totaled only 33.3 million tons or 43.7 per cent below the 59.2 million tons mined in the same period of 1948.

BAROMETERS of BUSINESS

		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	82.5	81.5	77.0	94.5
	Electric Power Distributed (million kilowatt hours)	5,530	5,466	5,342	5,317
	Bituminous Coal Production (daily av.—1000 tons)	1,258	1,227	814	2,029
	Petroleum Production (daily av.—1000 bbl)	4,723	4,670	4,671	5,507
	Construction Volume (ENR—Unit $1,000,000)	$257.3	$239.2	$190.3	$197.9
	Automobile and Truck Output (Ward's—number units)	144,078	142,718	156,436	112,342
	*Dates on request. †1949 weekly capacity is 1,843,516 net tons. 1948 weekly capacity was 1,802,476 net tons.				
TRADE	Freight Car Loadings (Unit—1000 cars)	710†	717	724	891
	Business Failures (Dun & Bradstreet, number)	176	171	167	103
	Money in Circulation (in millions of dollars)‡	$27,409	$27,419	$27,480	$27,966
	Department Store Sales (changes from like wk. a yr. ago)‡	−13%	−11%	−7%	+17%
	†Preliminary. ‡Federal Reserve Board.				
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$11,381	$12,600	$13,196	$11,924
	Federal Gross Debt (billions)	$254.5	$254.2	$252.8	$253.2
	Bond Volume, NYSE (millions)	$15.7	$17.1	$15.1	$13.5
	Stocks Sales, NYSE (thousands of shares)	5,876	5,280	4,561	3,949
	Loans and Investments (billions)†	$63.8	$63.5	$62.6	$63.2
	United States Gov't. Obligations Held (millions)†	$35,773	$35,590	$34,735	$35,023
	†Member banks, Federal Reserve System.				
PRICES	STEEL's Composite Finished Steel Price Average	$91.82	$91.82	$91.82	$93.55
	STEEL's Nonferrous Metal Composite‡	180.0	179.1	174.1	219.2
	All Commodities†	152.9	152.6	154.2	169.6
	Metals and Metal Products†	167.9	167.9	167.6	170.2
	†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100.				

Men of Industry

BENJAMIN S. SAMPSON

Benjamin S. Sampson has been appointed manager of Claud S. Gordon Co.'s Industrial Furnace & Oven Division, Chicago, which will handle the company's expanded national sales, engineering and service activities on industrial furnaces and ovens. Mr. Sampson formerly was district sales manager, Stewart Furnace Division, Sunbeam Corp.

—o—

Homer C. Lackey has been appointed sales manager of the Chicago-St. Louis-Houston district for Midvale Co., Philadelphia, and will have headquarters in Chicago. He has been connected with Midvale since 1930 and has formerly served as sales representative in Philadelphia and Detroit and as district sales manager in Cleveland.

—o—

Wells Mfg. Corp., Three Rivers, Mich., has appointed the following three men to executive positions in the engineering department: **Martin J. Verhuel,** appointed chief product engineer, Meat Saw Division; **Erwin Tobler,** chief product engineer, Metal Saw Division; and **David T. Evans,** research engineer for both divisions.

—o—

Henry P. Reid has been elected to the newly created office of vice president of engineering, Universal Atlas Cement Co., New York, subsidiary of U. S. Steel Corp. He has been associated with the company for 25 years, having served successively as special engineer, operating engineer, assistant to the president, and since 1947 as chief engineer. **Charles B. Baker** has been elected assistant to the president. He joined the cement company in 1942 and became secretary and general attorney the following year, and a director in 1944. He will continue to serve in these capacities in addition to his new assignment. **Fred T. Wiggins,** western sales vice president, has been elected vice president and assistant general sales manager with headquarters in New York. **George S. Neel,** who has been metropolitan Chicago sales manager for the last ten years, succeeds Mr. Wiggins as western sales manager with jurisdiction over sales offices in Kansas City, Mo., St. Louis, Minneapolis and Waco, Tex. **Wendell R. Doolittle Jr.** succeeds Mr. Neel in Chicago.

—o—

Howard H. Weber has been appointed general sales manager, wire and cable department, United States Rubber Co., New York. He will supervise sales of rubber insulated building wire, service entrance cable, armored and nonmetallic sheathed cable, portable cord and cord sets, Uskon electric radiant heating, battery separators, Electrix wiring devices, and other specialized electrical wires for radio, television, mining, construction and electrical industries.

—o—

Charles L. Jacobson, formerly assistant to the general manager of Chrysler Corp., Detroit, in charge of subsidiary operations, has been appointed president of Chrysler Motors Parts Corp. succeeding the late **F. C. Bahr.** Mr. Jacobson became associated with Chrysler in 1925 where he first worked in the field as regional manager in Minneapolis.

—o—

William S. Wilbraham, associated with Lukens Steel Co., Coatesville, Pa., since 1927, has been named coordinator of estimating for the company and its divisions, By-Products Steel Co. and Lukenweld. He will have direct charge of all sales estimating for the company and its divisions. **Glenn E. Johnston,** who has been a member of the sales development staff, has been transferred to the Chicago district sales office. He has been specializing in sales development work on Lukens clad steels among distributors and Lukens district offices in Pittsburgh, Cleveland, Cincinnati, and Montreal and Toronto, Canada, sales territories.

CHARLES L. JACOBSON

C. R. HARMON

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C. R. Harmon, sales manager in the Pittsburgh district for Firth Sterling Steel & Carbide Corp., McKeesport, Pa., has been appointed sales manager for the carbide sales division and **J. M. Stokes** is assistant sales manager. Formerly manager of carbide and specialty sales for Jessop Steel Co., Mr. Harmon later acted as sales manager for Penn Carbide & Alloy Casting Co. before joining Firth Sterling. **J. J. Sowko** is the new sales manager of the company's Pittsburgh branch.

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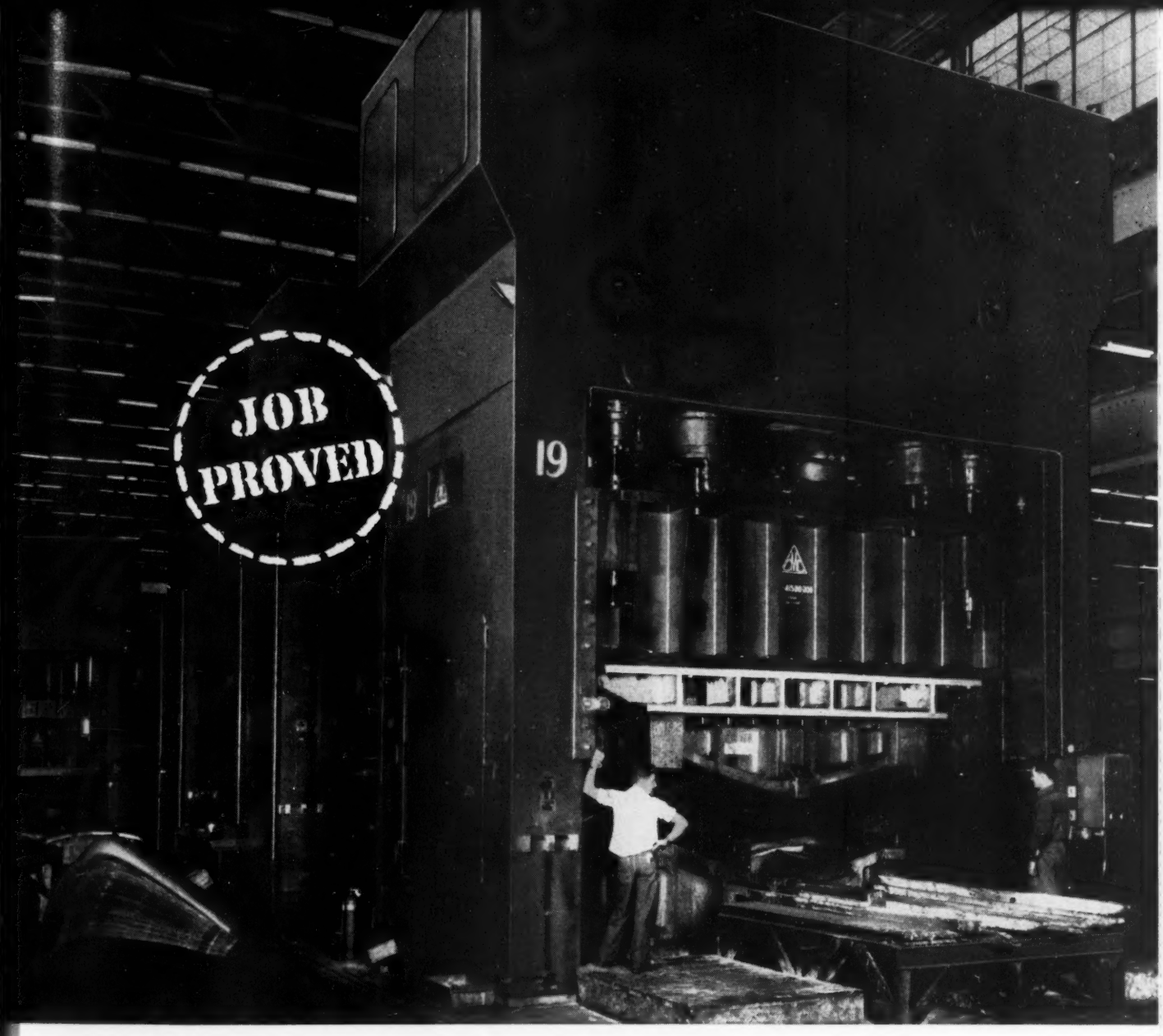
Frank M. Mason Jr. has been appointed director of engineering for Fairbanks, Morse & Co., Chicago. For several years manager of the Research Division in charge of all research, developments and patents, Mr. Mason joined the company in 1922.

—o—

George Zahn, for several years sales manager, Instrument Division, Stewart-Warner Corp., Chicago, has been appointed assistant for marketing to **F. A. Hiter,** senior vice president of the corporation. In his newly created position Mr. Zahn will co-ordinate activities of sales groups and conduct



SUNVIS GOING STRONG AFTER 3,500 HOURS

Body-Stamping Presses Still in A-1 Condition; Make-Up Oil Amounts to Only 1% per Month

One of the best-known automobile manufacturers selected Sunvis to lubricate three brand-new body-stamping presses. This equipment involved a big investment, and the company wanted the finest protection available.

After 15 months' use, the oil was tested and found to be in virtually the same condition as at the start. The machines were carefully examined and proved to be as good as new. The original charge of Sunvis is still in service and make-up oil has amounted to only one percent per month.

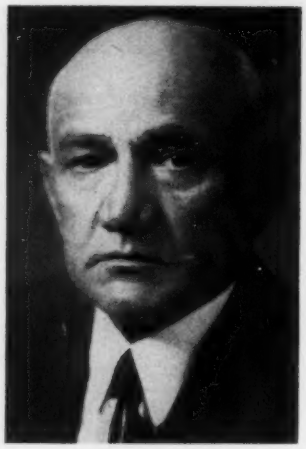
Because of performance like this, "Job Proved" Sunvis Oils are in wide demand wherever the finest lubrication is needed. They have high stability over a wide range of speeds, loads, and temperatures. You can count on Sunvis Oils for top performance and the surest protection of your machines. For full information call your nearest Sun Office.

SUN OIL COMPANY • *Philadelphia 3, Pa.*
In Canada: Sun Oil Company, Ltd.
Toronto and Montreal

SUN PETROLEUM PRODUCTS

"JOB PROVED" IN EVERY INDUSTRY

SUNOCO®



MACK C. LAKE

wholesale market and product analyses for automotive and other products of Division One. **Ernie N. Robinson,** who has been assistant sales manager of the Instrument Division, has been made sales manager to fill the post vacated by Mr. Zahn.

—o—

Mack C. Lake, internationally known mining engineer and geologist, has been appointed consulting engineer exclusively for Oliver Iron Mining Co. and other U. S. Steel Corp. subsidiaries. In his new capacity he will deal largely with the company's ore developments in foreign fields. For several years Mr. Lake was employed as a geologist for the M. A. Hanna Co. Since 1927 he has been active for other interests in mining operations and explorations although still maintaining close relationship with M. A. Hanna Co., particularly with the Labrador iron ore exploration. Mr. Lake has assisted Oliver Iron Mining since 1945 as consulting geologist in charge of the company's Venezuela exploration program.

—o—

Walter C. DeMaris, associated with Heintz Mfg. Co., Philadelphia, since 1922 as one of its officers, has been moved from director of purchases and made business manager, to perform special assignments under the direction of the president. **Samuel H. Paul,** founder and president of Paul & Beekman, who joined Heintz in 1945 to head up purchasing of a plant expansion program, has been moved into the office of director of purchases.

—o—

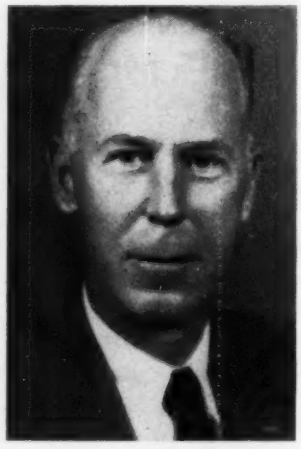
W. J. Howell has been appointed assistant to **Tomlinson Fort,** manager of apparatus sales, Westinghouse Electric Corp., Pittsburgh. He has served since 1941 as assistant to the Pacific Coast district manager, with headquarters in San Francisco. **Andrew G. Nelsen** has been appointed manager of the newly established Chicago district of the Lamp Division. **Adolph Frankel,** who has served the Westinghouse Lamp Division in various executive capacities, has been appointed to succeed Mr. Nelsen as manager of the division's northwestern district. Both men will make their headquarters in Chicago.

—o—

John E. Stukel Jr., former assistant professor at Carnegie Institute of Technology, Pittsburgh, has joined the operating department of Youngstown Sheet & Tube Co., Youngstown, as a development engineer. He is, at present, working in the office of **Dr. Karl L. Fetters,** special metallurgical engineer, in Youngstown.

—o—

Earle S. MacPherson, formerly executive engineer on design and development for Ford Motor Co., Dearborn, Mich., has been named chief engineer on all company products, reporting to **Harold T. Youngren,** vice president-engineering. **John Oswald** is executive engineer for styling and body engineering, and activities of **George W. Walker,** consulting stylist, will be increased in connection with the styling program for new products. Mr. Walker will work closely with Mr. Oswald on this program. **V. Y. Tallberg,** administrative engineer, has been given increased responsibilities. **Dale Roeder,** for many years head of commercial vehicle engineering, has been named executive engineer for this group. **H. S. Currier** has been appointed Ford passenger car engineer; **H. H. Gilbert,** Lincoln-Mercury passenger car engineer. Other department heads include: **Robert F. Kohr,** research engineer; **A. W. Frehse,** test engineer; **L. L. Boltz,** electrical engineer; and **H. Grebe,** body engineer.



GILBERT W. CHAPMAN

Elected president, Yale & Towne Mfg. Co., New York. Noted in STEEL, Aug. 15 issue, p. 82

GERALD F. HINES

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Gerald F. Hines has been appointed district sales manager for the Philadelphia area by Follansbee Steel Corp., Pittsburgh. He has been active in the steel business for almost 20 years.

—o—

J. W. Primeau has been elected president of the newly established B-W-H Service Parts Ltd., Merritton, Ont., which will distribute automotive replacement parts throughout Canada for Borg-Warner Corp., Chicago. Other newly elected officers are **J. W. DeLind Jr.** of Chicago and Detroit, vice president, and **E. P. McGavin** of Merritton, secretary-treasurer. **J. E. Gammage** has been appointed general manager and **L. J. Easterbrook,** sales manager. Mr. Primeau, chief executive of the new company, is also vice president and general manager of Hays Steel Products Ltd. of Merritton, and Mr. DeLind is president of Borg-Warner International Corp. The newly elected board of directors of B-W-H Service Parts Ltd. will consist of Messrs. Primeau, DeLind, Gammage and McGavin, and **R. W. Dose,** who is assistant secretary and assistant treasurer of Borg-Warner Corp.

—o—

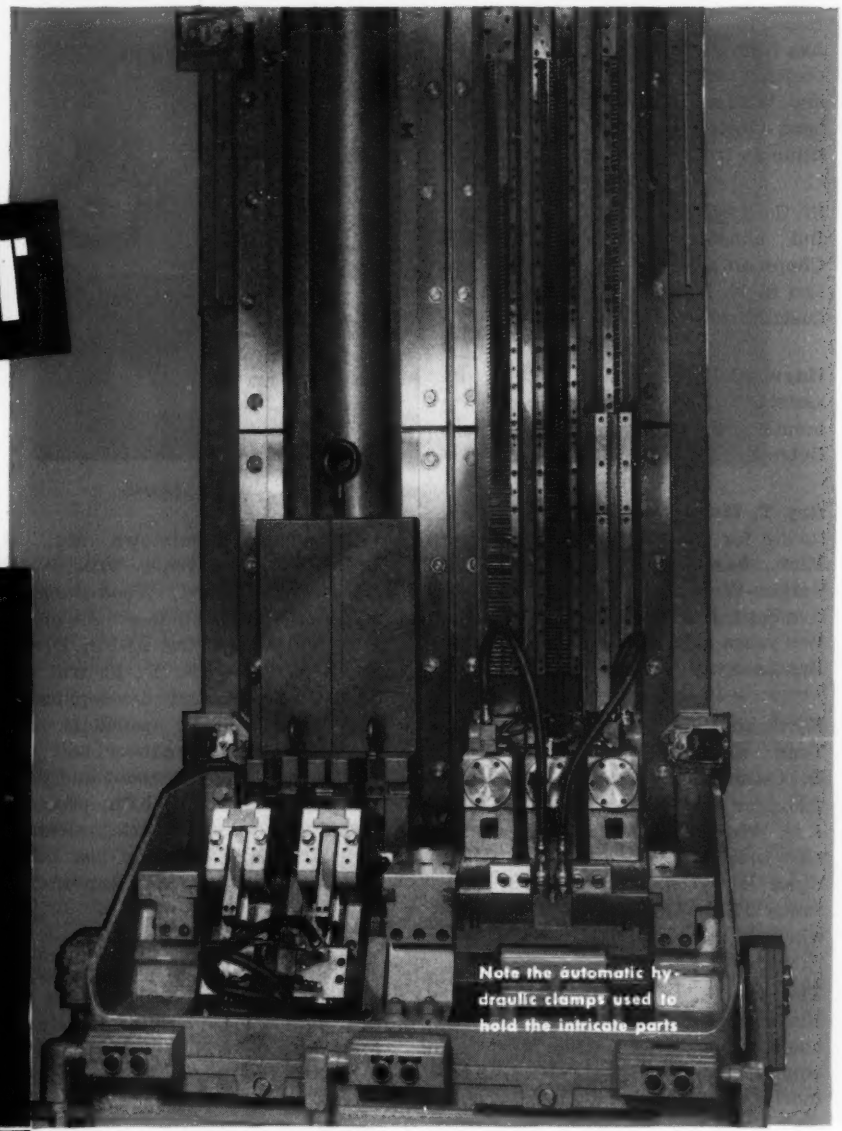
Harry T. Graham has been appointed assistant general sales manager of General Refractories Co., Philadelphia. He joined the company in 1937, assigned to the Chicago sales office, and transferred in 1946 to the home office. A year later he became assistant district sales manager of the Pittsburgh office. Mr. Graham will assume his new duties in Philadelphia about Sept. 1.

—o—

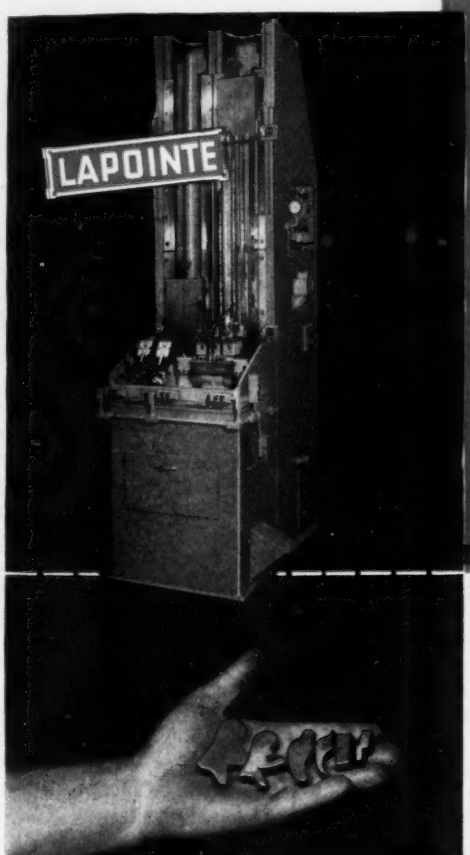
Cameron Baird, president of the Buf-

How we Multiply Production is NO SECRET

...BUT WE'VE GOT THE RABBITS GUESSING!



Note the automatic hydraulic clamps used to hold the intricate parts



(Before and after broaching)

Every part is perfect, where formerly 25% was scrapped or required reworking.

FASTER THAN RABBITS CAN MULTIPLY...

Rabbits are noted for their production rate—but this LAPOINTE Double Ram Vertical SURFACE BROACHING MACHINE has 'em stopped in their tracks!

Here's the proof: In a plant making shot guns, *one Lapointe broaching machine* is now producing a hammer, trigger, and catch at the rate of 280 *of each per hour!* Formerly the hammer required 8 milling and 3 burring operations; the trigger, 4 milling operations; the catch, 3 milling and 2 burring operations. And here's the BIG news: *By changing to broaching,* the production rate per hour jumped 300%!

How much could you save in time, money and *floor space* on certain of your own high-production requirements? Our new bulletin may give you some ideas! Send for DRV-3.

THE Lapointe MACHINE TOOL COMPANY

HUDSON, MASSACHUSETTS • U. S. A.

Branch Factory • Edgware • Middlesex • England

HUDSON LAPOINTE MASS.

THE WORLD'S OLDEST AND LARGEST MANUFACTURERS OF BROACHES AND BROACHING MACHINES

falo Pipe & Foundry Corp., Buffalo, has been elected to the newly created position of chairman of the board, and **William C. Baird,** treasurer, has been elected president, and will continue as treasurer.

—o—

S. G. Taylor Chain Co., Hammond, Ind., announces promotion of **E. W. Chapman** as assistant sales manager, and **S. N. Morison** as manager of industrial sales.

—o—

Hayward F. York has been appointed assistant plant engineer of the Plymouth Division of Chrysler Corp., Detroit.

—o—

Roy T. Hurley, director of manufacturing for Ford Motor Co., Dearborn, Mich., has been named president of Curtiss-Wright Corp., New York, effective Sept. 1. Before joining Ford about two years ago he was associated with Bendix Aviation Corp. for 14 years.

—o—

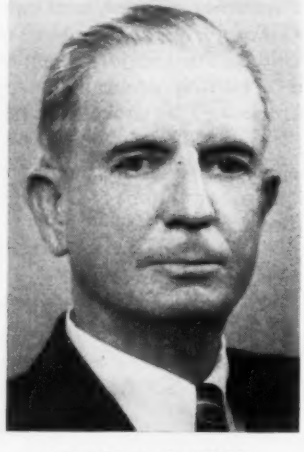
Kerrigan Iron Works Inc., Nashville, Tenn., announces appointment of **D. D. Connors** as its New York sales manager with offices at 274 Madison Ave. With 30 years' experience in the steel industry, Mr. Connors joins Kerrigan after association with Goldsmith Metal Lath Co. of Cincinnati, where he was sales manager.

—o—

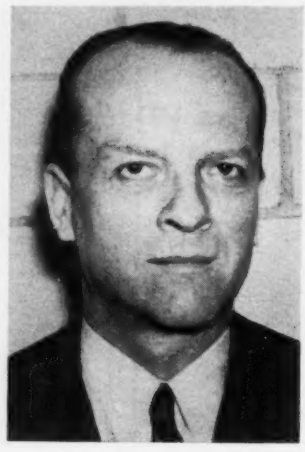
Thomas M. Chalmers has joined Blaw-Knox Co., Pittsburgh, as engineering consultant on steel mill equipment. Mr. Chalmers was formerly vice president in charge of operations of Tennessee Coal, Iron & Railroad Co., Birmingham. He will devote special attention to rolling mill machinery produced by the company's Lewis Division.

—o—

George T. Ladd has been appointed production engineer, and **Howard W. Crusey** as sales engineer of the Al-Fin Division of Fairchild Engine & Airplane Corp., Hagerstown, Md. Mr. Ladd spent 11 years with Wright Aeronautical Corp., Wood-Ridge, N. J., as a project engineer. As production engineer of the Al-Fin Division at Farmingdale, N. Y., he will work on the design and development of bonded bi-metallic products. Mr. Crusey as sales engineer will work with customers on present and potential applications of Al-Fin process in the automotive, electric, electronic and aircraft fields. He has been a service engineer with Thompson Products Co., Cleveland.



THOMAS M. CHALMERS



W. M. FRAME

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W. M. Frame has been appointed works manager in charge of all engineering and manufacturing operations for Kerotest Mfg. Co., Pittsburgh. He formerly was works manager of Spang Chalfant Division, National Supply Co.

—o—

Harold Q. Noack has been appointed assistant to **O. L. Pringle,** vice president in charge of sales, Columbia Steel Co., San Francisco, subsidiary, U. S. Steel Corp. Mr. Noack has resigned as Pacific Coast manager of Phelps Dodge Copper Products Corp. to accept the new position. He will handle assignments in connection with Columbia's customer relations program.

—o—

A. J. Loose has been elected vice president and treasurer of Texsteam Corp., Houston, the controlling interest of which was recently acquired by Vapor Heating Corp., Chicago. Until recently Mr. Loose was associated with Vapor's Chicago plant, working on engineering and production of steam generators for the last 11 years. In his new position he will be in active charge of operations of Texsteam Corp.

—o—

Angus V. McLeod has been appointed general traffic manager of Permanente Metals Corp., Oakland, Calif. **S. C. Knight,** assistant general traffic manager of Permanente, has been transferred to position of assistant general traffic manager of Kaiser Steel Corp.

—o—

Detroit Broach Co. announces appointment of **Earl W. Keir** as representative for the southern half of Wisconsin. **Earl J. Golz,** who is associated with Mr. Keir, will also be serving Detroit Broach customers in the territory, and they will be located in Milwaukee.

—o—

J. M. Cosgrove, district sales representative for Kaiser Steel Corp. in the Northwest since 1945, has been named Northwest district sales manager with headquarters in Seattle. Mr. Cosgrove has been in the steel business since 1930 and before joining Kaiser Steel was assistant materials manager of Commercial Iron Works, Portland, Oreg.

—o—

Columbia Tool Steel Co., Chicago Heights, Ill., announces appointment of **James R. Hewitt Jr.** as its Texas and southwestern representative. He will have headquarters in Houston.

—o—

Howard B. Downs was named general sales manager Solventol Chemical Products, Detroit. He joined the company's sales staff in 1937 and for the last two years was advertising director of the firm. In his new position Mr. Downs will co-ordinate Solventol sales in three major manufacturing areas: Retail, bulk and industrial.

—o—

Frederick W. Trezise has been named head of the college of engineering science, Navy Pier Division, University of Illinois, Chicago, to succeed **Randolph P. Hoelscher,** who has

HOWARD B. DOWNS

EARL M. RICHARDS

W. M. KELLEY

N. J. CLARKE

been made head of the general engineering drawing department at the Urbana, Ill., campus of the university. Dean Hoelscher was transferred from Urbana to Chicago in 1946 when the Navy Pier Division was opened. Dean Trezise has been chairman of engineering sciences at the university's Galesburg Undergraduate Division, Galesburg, Ill., now closed.

—o—

Earl M. Richards, vice president in charge of operations, Republic Steel Corp., Cleveland, has been elected vice president in charge of planning and development to serve in an advisory capacity to the company's president on long-range planning and development of raw material sources, plants, facilities and new products. He is succeeded as vice president in charge of operations by **W. M. Kelley,** who for the last four years has been in charge of manufacturing divisions of the corporation. **N. J. Clarke,** senior vice president of Republic, and a veteran of 52 years in the steel industry, will retire Dec. 31. He became a director of the corporation in 1939, and is also a director of several Republic subsidiary companies including Fretz-Moon Tube Co. and Vance Iron & Steel Co.

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Walter H. Wiewel has been appointed vice president in charge of sales, Crucible Steel Co. of America, New York. He retains his present post as president of Crucible's subsidiary, Trent Tube Co., East Troy, Wis., and also was elected to the Crucible board of directors. Mr. Wiewel will head all sales activities of Crucible and Trent, and will have headquarters in Pittsburgh. **R. S. Poister,** vice president and a director of the company, is now in charge of all manufacturing operations of Crucible. **M. E. Cummings** has been appointed assistant vice president in the operations department, with headquarters in Pittsburgh. **William E. Pennington,** formerly assistant general manager of sales, becomes eastern sales manager with headquarters in New York, and **John S. Billingsley** becomes central sales manager with headquarters in Pittsburgh, where he has been branch sales manager.

—o—

William A. Henderson has been appointed Detroit district sales representative of Fort Duquesne Steel Co., Pittsburgh, and its affiliate, Hamilton Steel Co., Cleveland. He has been Detroit representative for Ohio Stainless & Commercial Steel Co., and previously represented Eberhard Mfg. Co. in the Detroit area for 20 years. **Eugene A. Johnson** has been placed in charge of sales in the Pittsburgh area for Fort Duquesne Steel Co. Since 1947 he has been manager of the order department of Hamilton Steel Co.

—o—

W. H. Moffatt has been appointed field representative for Udylite Corp. in Rochester, N. Y. He joined the corporation in 1941 as a member of the laboratory staff, and during the past year has represented Udylite as sales and service engineer for New York state.

OBITUARIES . . .

Alfred J. Miller, 72, chairman, Whitehead Bros. Co., New York and Providence, R. I., dealer in foundry supplies, died recently at his home in Newport, R. I. He had long been associated with the company and in 1924 was elected president, in which position he served until 1948, when he became board chairman.

—o—

Fred Finkl, 73, executive vice president, A. Finkl & Sons Co., Chicago, died July 23.

—o—

Theodore E. Moritz, 77, who retired in 1943 as purchasing agent, American Steel Foundries, Chicago, died Aug. 9 in Evanston, Ill. He had been associated with the company more than 40 years.

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Ezra W. Clark, 69, former city editor of the old Chicago *Inter-Ocean* and retired vice president of Clark Equipment Co., Battle Creek, Mich., died Aug. 10.

—o—

Frederick A. Schuessler, 57, superintendent of merchant mills, Youngstown Sheet & Tube Co.'s Indiana Harbor Works, East Chicago, Ind., died Aug. 11 in Valparaiso, Ind. He had been associated with the company 30 years.

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James P. English, 78, retired Bethlehem Pacific Coast Steel Corp. official, died Aug. 11. He went to Seattle in 1919 as general superintendent of Pacific Coast Steel Co., later merged with Bethlehem.

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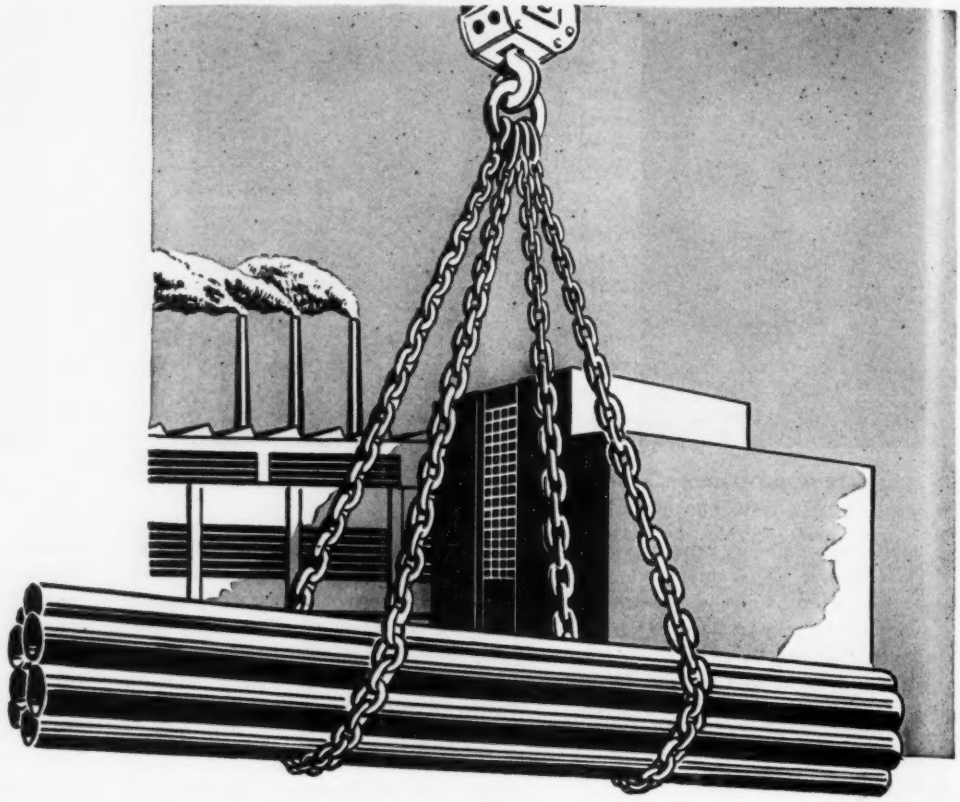
Peter H. McGarigle, 85, for 30 years president, McGarigle Machine Co., Niagara Falls, N. Y., died Aug. 9.

—o—

Robert Lock, 77, who built the nation's first electrically-driven steel mill in Apollo, Pa., in 1912, died Aug. 8. He was connected with American Sheet & Tin Plate Co., Pittsburgh, for 21 years before going to Apollo Steel Co. at Apollo. He later was associated with Monongahela Iron & Steel Co., Pittsburgh, and left that concern to join Ashtabula Sheet & Steel Co. as superintendent, retaining that post until he retired in 1932.



Put yourself in his shoes—*safely*

Five tons of steel overhead . . . a wife and three children at home. It's a familiar scene every day in many plants.

But are you providing as much protection for the man below as you would want—*in his shoes?*

When sling chains are Cleveland made, you know there's absolute protection against sudden breakage. For Cleveland Sterling Grade Sling Chains are hand forged by craftsmen from double refined, puddled wrought iron.

Every Cleveland chain passes rigid tests before shipment. The certificate of test with each chain says *dependability.* It's your assurance of proved resistance to shock loads.

Next time you order sling chains, specify Cleveland Sterling Grade. And remember—National Safety authorities give this chain *the highest margin of safety rating.* P & P—5000

A STYLE FOR ANY TYPE OF HEAVY DUTY LIFTING

• Cleveland Sterling Grade Sling Chains are available with single ... double ... 3-way or 4-way slings.

Fittings include rings ... sling or grab hooks ... pear-shaped links. Cleveland fittings more than equal chain strength—*for greater safety ...*

CLEVELAND CHAIN

THE CLEVELAND CHAIN & MFG. CO.
Cleveland 5, Ohio

Since 1869

Associate Companies: David Round and Son, Cleveland 5, Ohio • The Bridgeport Chain & Mfg. Co., Bridgeport 1, Conn. • Seattle Chain & Mfg. Co., Seattle 8, Wash. • Round California Chain Co., So. San Francisco and Los Angeles 54, Calif. • Woodhouse Chain Works, Trenton 7, N. J.

Engineering News . . . AT A GLANCE

"MARATHON" TESTING— To simulate oil-well conditions, sections of seamless steel drill pipe are flooded with corrosive brine and rotated for weeks under bending forces up to 1,200,000 inch-pounds on a big, corrosion-fatigue testing unit at National Works, National Tube Co. McKeesport, Pa. Machine is reported to be the only unit of its kind used by a steel producer to test full-size drill pipe. Weighing about 6 tons, it can handle pieces of drill pipe up to 8 5/8-inches diameter from 24 to 120 inches long. Main spindle of the tester can be rotated up to 1000 revolutions per minute.

TO AID NEW ALLOY USERS— Industrial Products Division, Elgin National Watch Co., Aurora, Ill., reports availability of special metallurgical and engineering services to assist manufacturers interested in the application and processing of the new corrosion and fatigue resistant spring alloy developed by the company recently. The alloy, referred to as Elgiloy, is said to exceed spring tempered high carbon steel in fatigue and set resistance by nearly three to one. Its corrosion resistance, according to the company, also is superior to stainless of the 18-8 type.

"COOLING" STEAM— Steam plants lying relatively idle in summer months now can be used for air conditioning purposes by employing a refrigerating unit developed recently by Carrier Corp., Syracuse, N. Y. In utilizing steam for air conditioning, the machine uses plain water as a refrigerant and a simple salt as an absorbent. It operates on either high or low pressure steam or even low pressure waste steam. Currently, machines are being built in 115, 150 and 200-ton capacities, single units being capable of conditioning areas of 34,000 to 60,000 square feet.

BARREL CARBURIZATION— Method of straight line heating, developed recently by Surface Combustion Corp. Toledo, O., enables many parts, previously carburized in batch or continuous furnaces, to be carburized in barrels in much the same manner as parts are rotated in barrels for cleaning and electroplating. Entire process, referred to as "barrel carburization", is automatic from hopper loading to discharging. Parts are heated, carburized, quenched, washed, reheated, quenched and drawn by the technique.

PROGRESSIVE SOLIDIFICATION— Entirely new casting technique developed and perfected in the Gould Research Laboratory, Depew, N. Y., is reported to solve problems that have plagued battery makers for years. Referred to as "progressive solidification" the method makes it possible, for the first time, to produce sound, nonporous Z grids that are solid all the way through. Formerly, grids of every manufacture included spots which offered susceptible inner surfaces to the corrosive action of battery electrolyte.

NOISELESS AIR— Huge fans installed recently in the new library annex of the University of California by the Berkeley plant of Westinghouse Electric Corp.'s Sturtevant Division, will supply fresh air in the structure at the rate of 92,000 cubic feet per minute with least possible noise. Both of the fans, which weigh 6700 pounds each, are powered by a 15 horsepower motor turning at 900 rpm, transmitting power to fan shafts through noiseless V-belt reduction drives. The "wheels" themselves, with backwardly inclined blades, turn at a relatively slow speed of 250 rpm.

SIMPLIFIED HANDLING — Machines for trimming die castings in the Fond du Lac, Wis. plant of Barlow & Seelig Mfg. Co. usually are spotted where needed in the sequence of operations. But whenever a new die is put into use and a new series of operations is nedeed, they are mounted so they can be moved by either a crane or fork truck to a new location. Even gathering of sprues, gates, flash and rejects is simplified. This is done by means of charge buckets on casters which can be trucked back to the melting furnaces where they are handled by an elevating mechanism that lifts and dumps the contents. (p. 60)

COST CUTTING PROCESS—Thanks to American industrial skill, farmers in this country today are reaping the harvest of one other subsidy. This time it is in form of economies derived in the purchase of farm equipment. Through use of resistance welding, which has speeded assembly operations, and savings made in being able to employ lighter weight materials, implement makers have cut costs of producing agriculture working tools tremendously. (p. 64)

ECONOMICAL MATERIAL — While powder metallurgy is not a panacea for all designers' troubles, it is recognized as a process well suited for fabricating many small structural parts in large quantities. J. L. Bonanno of Lionel Corp., in discussing experiences of his company in fabricating toy train parts, points out that iron powder is the cheapest material of construction today in spite of the fact it has steadily improved in quality. He also states that method of manufacture with this material can provide economies in instances where small production runs are involved, if tooling and setup costs are not unreasonably high. (p. 68)

HIGHER TENSILE STRENGTHS— Modern construction would hardly be possible without structural steel shapes. Recent trends, it is pointed out, have been toward higher tensile strengths of the order of 60,000 to 72,000 pounds per square inch. Alloy steels also are coming into prominence through efforts to produce higher strength sections and thus reduce the weight of materials required. These steels are prominent in car building. (p. 82)

UNIVERSITY OF MICHIGAN LIBRARIES

Aluminum

DIE CASTING PRODUCTION

Facilitated by New Plant Layout

Parts for washing and ironing machines are cast, trimmed, machined and handled efficiently in new mechanized setup

By ROY F. JOHNSON
General Manager
Fond du Lac Division
Barlow & Seelig Mfg. Co.
Fond du Lac, Wis.

AMONG the finest and most modern captive setups for producing aluminum die castings is one recently put into operation as a part of the Fond du Lac, Wis. division of Barlow & Seelig Mfg. Co., a large producer of domestic washing and ironing machines. Efficient operations at this plant are the result of careful preliminary planning.

Primary considerations controlling plant layout included those involved in handling metals to be cast, melting and distributing the metal efficiently, holding batches at proper temperature at each machine, casting, cooling, inspecting, trimming and machining the castings expeditiously and with minimum manual handling, shifting castings to packing and shipping points with minimum labor and finally, gathering and remelting sprues, gates, flash and rejected castings.

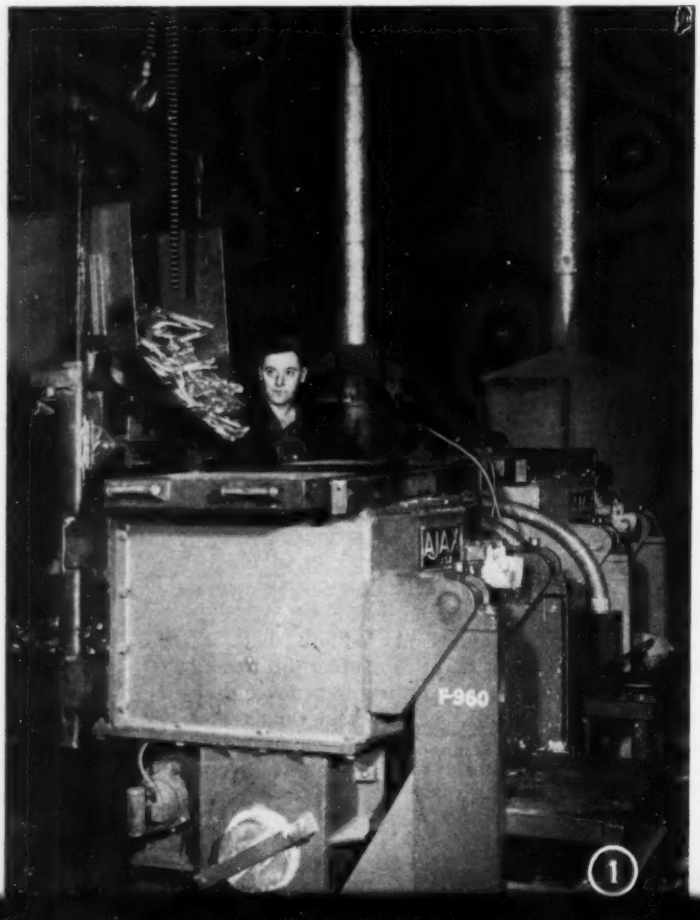


Fig. 1—These two 60-kw Ajax furnaces do all the melting. They are charged from elevating bucket, at left in photo

Handling Raw Metal—At present, ready-alloyed ingots are received in freight cars or trucks on a depressed siding at the far end of the bay, Fig. 2, unloading being done at floor level by a fork truck which spots each load in a floor area close to the melting furnaces. Furnacemen load ingots (also gates and sprues returned to an adjacent area) into wheeled charging buckets that are rolled to the furnace, elevated by the same electric lift hoist used for furnace tilting and automatically dump the charge into the furnace, Fig. 1.

These operations could be further mechanized if the volume warranted but this would save little labor, as a single furnaceman has ample time to do the work besides tending the furnaces, except for occasional unloading of cars and trucks done by a utility man with other duties to perform elsewhere.

Melting and distributing metal involves several factors of great importance in overall economy. Should melting be done by gas or oil firing or electrically? Electric melting (in the low-frequency Ajax induction furnaces selected) is simple, convenient, nearly foolproof, easily and precisely controlled but furnaces involve higher first cost. Although electric energy cost is not much lower than that for gas or oil, the furnaces involve much less wasted heat, thus making for comfort and convenience of personnel, and no exhaust flues are required. Moreover, the closer temperature control results in constant casting conditions. These factors make electric melting the better choice and the same is true in respect to holding furnaces.

Induction Furnaces—Two 60-kw Ajax melting furnaces were chosen partly because of their proved success in similar installations. Also, this single-compartment electric type is well adapted to making alloys from base metals or from scrap (as well as from ingots now purchased ready-alloyed) which, for some metal market conditions, is highly advantageous. At

Fig. 2—General view of the die casting department looking toward the melting furnaces at far right next to the metal storage area which is adjacent to the unloading dock and siding

present, only one alloy (ASTM-SC6, containing 3 to 4 per cent copper and 7.5 to 9.5 per cent silicon) is used but any of the aluminum alloys can be made up readily in the furnaces, if a change in conditions demanded this.

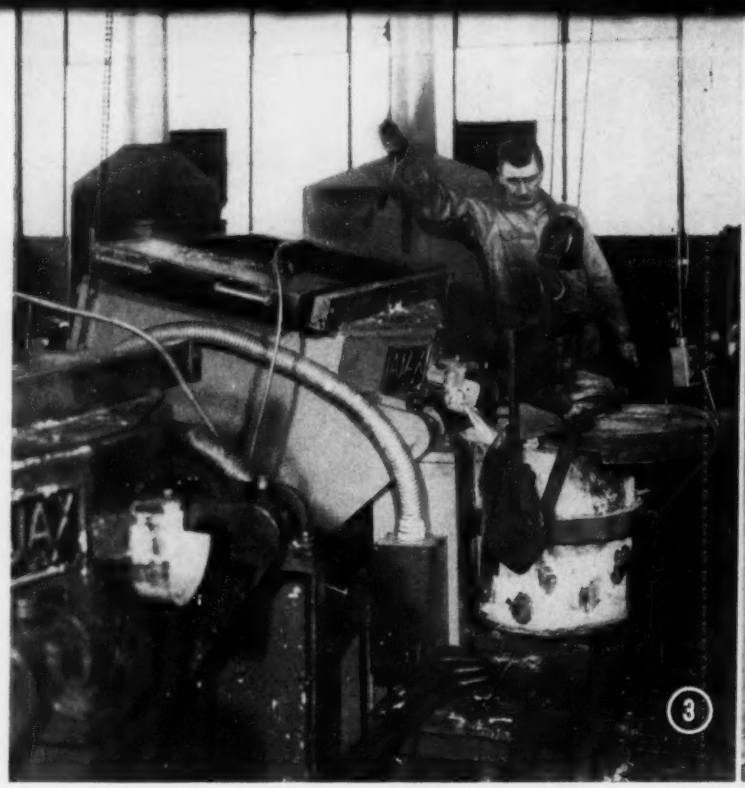
In the electric furnace, the metal is never overheated and, as there are no fumes, there is a minimum tendency to hydrogen absorption. Although the metal is constantly circulated, there is no surging, and drossing is minimized. Heating passages require cleaning only once a day by merely pushing a pipe into them to dislodge any oxide that may collect on passage walls.

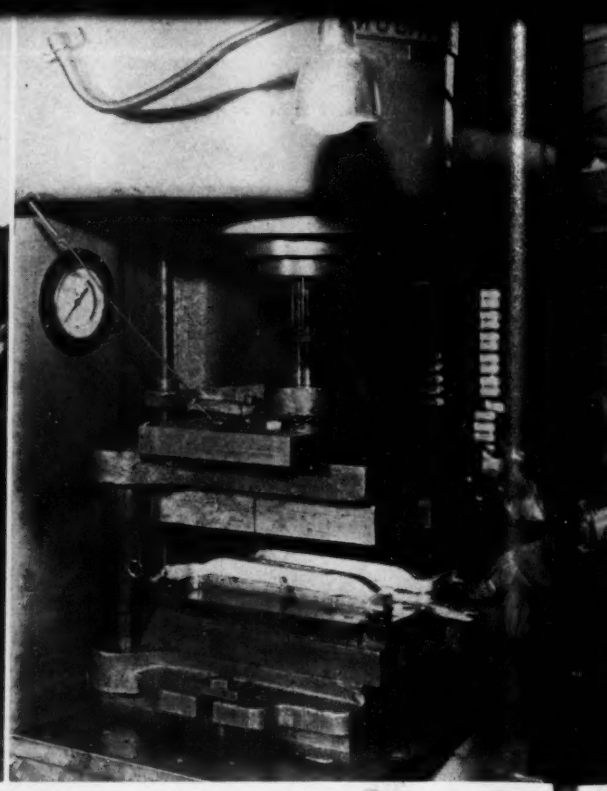
Some molten metal must always remain in these furnaces and, as molten metal is needed to start them, a small gas-fired furnace is provided for this purpose only. It is seldom used. To transfer molten metal to holding furnaces at each die casting machine, the full ladle shown in Fig. 3 is employed and is kept hot under a hood by a gas flame when not in use.

For filling, the ladle is set on a metal stand. As the furnace is tilted on its trunnions by an electric hoist, the metal flows a minimum distance and does not surge. This too tends to keep drossing low. The ladle has a cover that minimizes heat loss and hydrogen absorption from atmospheric moisture. In addition, the ladle has a hinged stainless steel spout that automatically comes into use as the ladle tilts near its maximum angle when holding furnaces are filled. This prevents any splashing of metal at filling points. The ladle is moved by a trolley hoist along a monorail and serves all holding furnaces, these being in a row along a side aisle. Refractory lined filling troughs project toward the aisle from each holding furnace.

Holding Furnaces—Holding furnaces are of great importance partly because they control the casting temperature which should be as close to the freezing point as possible and still yield good castings, for then the metal has less tendency to heat the die surface and cause it to check and become rough. In practice, for this alloy, the temperature is 1195-1200° F and is held in each of the six 20-kw Ajax holding furnaces within plus or minus 2½° F or much closer than is realized in flame heated furnaces.

This low temperature and close control also help to minimize hydrogen absorption and the constant slow circulation of the metal in the furnace tends to bring oxides to the surface and to keep dross out of castings. It is also believed that the low hydrogen content reduces the tendency of aluminum alloy to "solder" and cause sticking in the die. In any event, less sticking seems to be encountered when this form of furnace is used. From the operator's standpoint, there is the important fact that heat radiation is low and operating conditions are better than when flame fired equipment is used. No exhaust stacks are





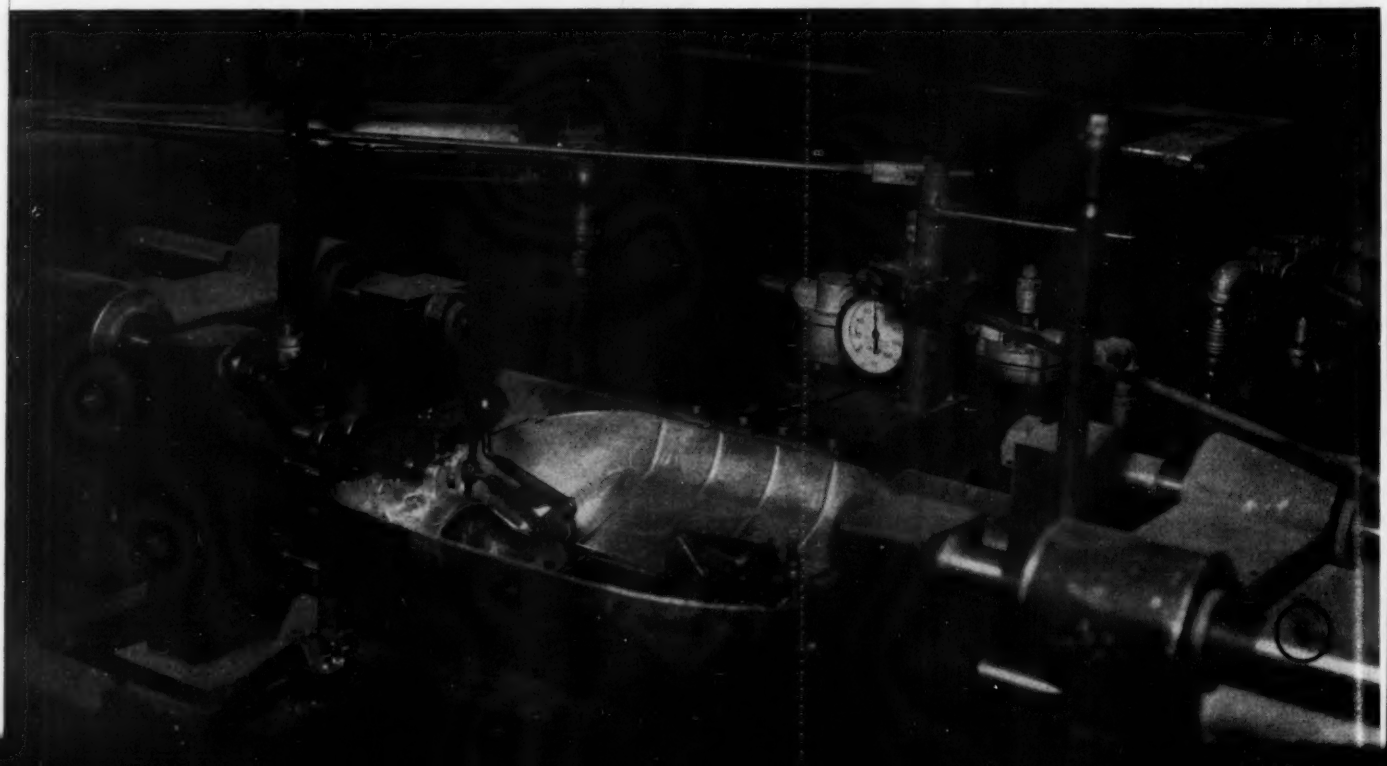
needed and their absence makes for convenience besides reducing heat radiation around machines.

Die Casting Machines—Casting aluminum advantageously involves many factors, including some just mentioned and others that relate to the machine used, to the pressure employed, to injection rates, to die construction, temperature and lubrication and to other considerations too numerous to be dealt with in a brief article. Four large HHP3X machines and two HP1CC machines are now in use. Both sizes are sturdy and have powerful locking toggles as well as ability to apply to the metal the pressure required and to keep the dies securely locked. Dies can be filled rapidly at moderate pressure (averaging perhaps around 2500 psi) and then are subjected to a much higher pressure (10,000 to 25,000 psi) as solidification takes place. All timing is automatic once the operator ladles the charge and starts the cycle by pressing a pedal. Production rates are believed to be as high as for any machines making aluminum castings of comparable size, and quality is excellent.

Back of each machine is a roller conveyor about 24 inches above the floor. This conveyor starts just back of the operator and carries tote pans that are easily moved along the rollers. After castings are ejected and removed from the die, they are placed first on a steel shelf above the first tote box. There the operator makes a casual inspection and proceeds with making the next casting if no flaws are found.

When the next casting comes from the machine the prior one is shifted into the tote box; when the

Fig. 6—After a die-cast wringer apron is clamped in this fixture, an air-operated device, top left, automatically feeds in two multiple-spindle drilling heads driven by Delta presses horizontally



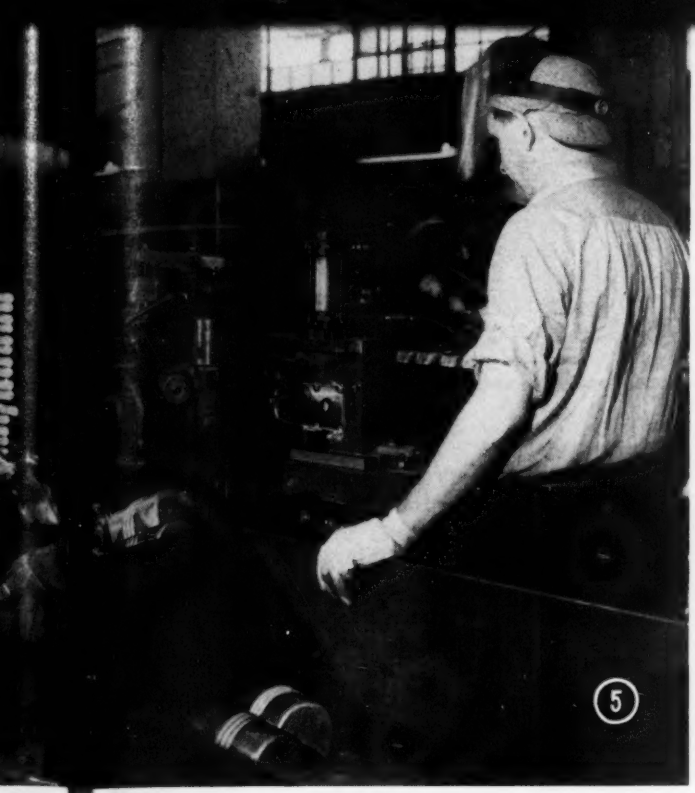


Fig. 3—Filling a transfer ladle with molten aluminum as the furnace is tilted about its trunnions by a chain hoist. No surging or splashing of metal occurs and very little dross is formed. No flux is used in furnaces

Fig. 4—One of the Denison Hydroil presses used to operate trim dies. In this case, right and left castings are trimmed in one stroke that also cuts off the connecting gates

Fig. 5—Setup for milling the face of a die casting that is air-clamped in the fixture, center, after a shoe has been placed inside it, to prevent distortion of the casting. Feed mechanism is also air-operated

latter contains sufficient castings, it is moved to the inspector's station, next along the conveyor, and is replaced by an empty pan. From inspection, pans of accepted castings are moved to machines spotted along the conveyor. Gates are broken or sawed off and trimming of flash is done, usually in a light Denison hydraulic press, Fig. 4, using a trim die made for the piece.

Additional Machining—If any other machining is needed, it is done at subsequent stations, as in Figs. 5 and 6, the machines being spotted where needed. They can be picked up and moved elsewhere, when a new die is put into use and a new series of operations is needed, moving being done either by the crane or by a fork truck. Sprues or "biscuits," gates, flash and any scrapped castings are thrown into charge buckets under the conveyors (where considerable storage space exists). Thus, the setup is made flexible and can be quickly changed to meet varying requirements.

Shifting of castings is rapid and efficient. By the time boxes of castings reach the outer ends of conveyors, machining (except polishing, if required) is completed. Along the ends of these transverse conveyors is a long longitudinal conveyor onto which tote boxes are shifted for transfer either to shipping or to a point near the end of the longitudinal conveyor where polishing lathes are available.

In general, there is no manual handling of loaded tote boxes and the castings are moved individually only when shifted to an inspection bench or to some tool for trim or machine operations. This setup avoids backtracking and a minimum of manual labor is needed.

Gathering of sprues, gates, flash and rejects is simplified by using charge buckets on casters. These buckets are easily trucked back to the melting furnaces, where the buckets are handled by the elevating mechanism, which dumps the contents into the furnaces. Ingots are charged directly into the furnaces. No flux is required. Although a conveyor could be used to collect sprues and gates, the volume of these is not sufficient to warrant its installation at present, especially as the castered charging buckets are so easily handled.

Changing Dies—Besides the foregoing, certain other factors deserve mention. Die changing is facilitated in some cases by use of the overhead crane but in other cases dies are handled by the fork truck. To date, dies have been built outside but a tool room sufficient to keep them in good repair is maintained in the plant.

All water, air and electric supply lines are below the floor. Taps are provided at casting machines and at points under the roller conveyors. This makes it easy to connect machines for supplementary operations wherever they can be spotted to best advantage.

Casting machines are provided with nitrogen accumulator bottles and each machine is a self-contained unit having its own operating equipment, including motors and pumps. High pressure piping is exposed and easily repaired, should a break occur. Absence of liquid and gas fuel reduces fire hazards.

Each casting machine has a water manifold with valve controlled outlets for die cooling and the water from cooling lines flows into a common waste trough or hopper in line with the operator's vision so that he knows whether flow is on or off and can control die temperature as needed. A variety of different die and plunger lubricants which give best results for the particular conditions is employed.

Several special setups for rapid machining are used. One of these is a very simple fixture that slides with the casting as a Delta band saw cuts off the gate and flash. This insures a cut at correct position and also is safer and less likely to cause saw breakage than if the casting is held and moved by hands alone.

In the setup, Fig. 5, a casting of approximately half-cylindrical shape is air clamped in the fixture (center) after inserting a filler plate or shoe that prevents distortion under clamp pressure. Then the parting face is milled flat in a Kent-Owen machine equipped with air feed. This rapid, semiautomatic operation removes the gate. The latter was formerly broken off and often broke out the casting edge.

Two-way drilling of five holes in wringer base castings is done in the setup, Fig. 6, after the work is toggle clamped in a box fixture. All drills are fed in simultaneously and automatically by a Senacon-Bellows air cylinder, top left. This is a rapid operation. Each of the two multiple-spindle heads is operated by a Delta drill press set horizontally.

FARMING implements are attached to the front frame of the Farmall tractors—the frame extending from the center of the tractor forward. These extensions must be exceptionally strong. International Harvester uses 4 and 5-inch channel iron, ¼-inch thick. Channels are flash welded to a sturdy forged frame mounting bracket made of 1025 steel. Tests have repeatedly proved this weld joint stronger than any other part of the channel iron, Harvester says. Flash welding enables two men (one machine operator and one flash trimmer) to produce over 50 assemblies per hour.

To attach nuts to the clutch shackle, Caterpillar now uses projection welding, and with a simple press welder, Fig. 9, attaches the nuts at a rate of 169 complete assemblies per hour. The ease with which this is done is indicated by the employment of a woman operator.

In tractor transmissions resistance welding is also being used to reduce costs and increase output. Examples of these parts are the shifter forks for tractor transmissions as produced by IHC at its Chicago plant. Today, these parts are assembled by flash welding—in 35 seconds each—at a saving in cost of 25 per cent for the completed part. What is more, the flash-welding operation insures a more reliable, stronger joint, with rejections practically nil under Magnaflux tests. Fig. 8 shows one of the shifter forks before and after flash welding.

Another common transmission part, produced by flash-welding on the Ferguson tractor for instance, is the shift lever. This is fabricated by welding together two simple forgings—the lever and the ball end—avoiding the use of costly and complicated single piece forgings, or weaker multipart construction.

To connect the transmission output shaft to the rear end drive, Ferguson has also used a construction consisting of two short splined forgings, flash-welded to either end of a tube. This greatly reduces the machining and forging cost on this part.

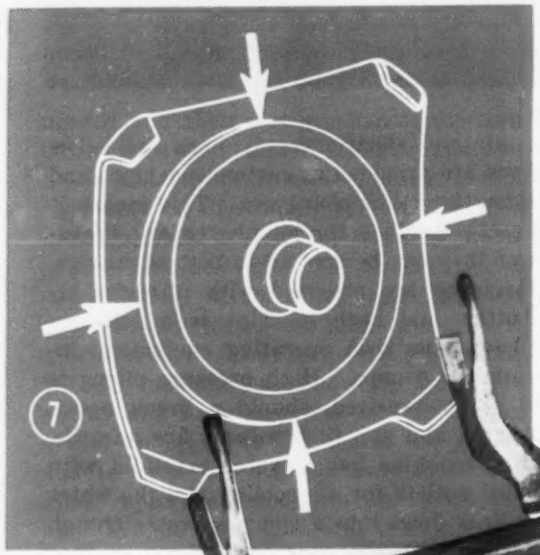


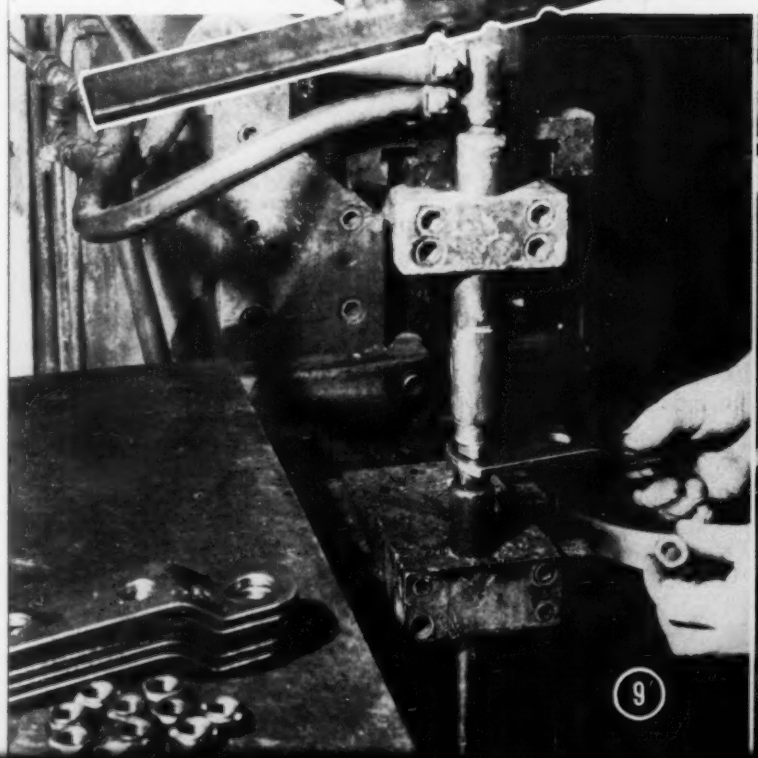
Fig. 7—Tractor front wheel showing spot welded reinforcement

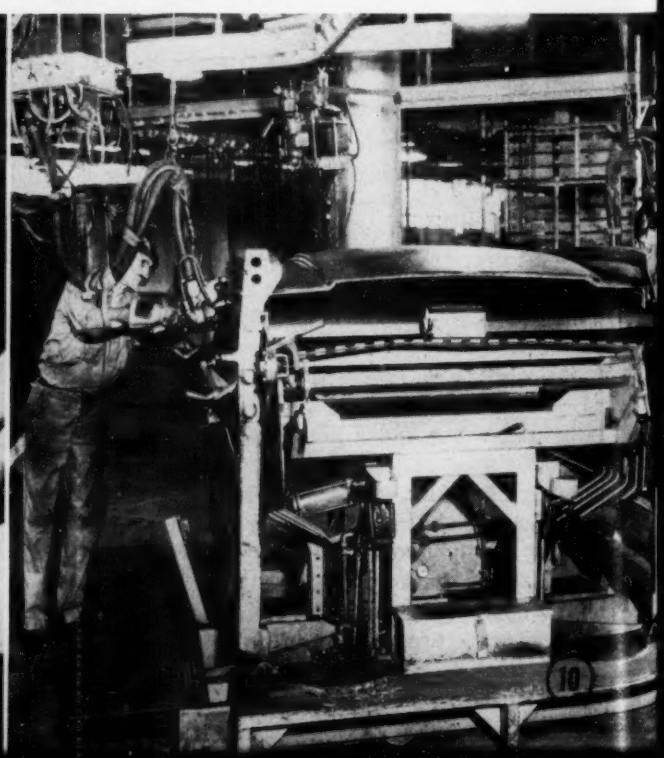
Fig. 8—Tractor shifter forks before and after flash weld assembly

Fig. 9—Projection welding tractor clutch shackles

Fig. 10—Spot welding a combine subassembly

Fig. 11—Planter grain hopper and fertilizer hopper





Concluding installment of two-part article

...QUIPMENT MANUFACTURING METHODS

...and costs improved by resistance welding

Brake Assemblies—In brake assemblies there are any number of parts which lend themselves to lower cost fabrication by resistance welding, and tractor manufacturers are availing themselves of this. For instance, brake shoes are produced by making the shoe and its web in separate simple stampings and then projection welding them together to make a single rigid assembly. Much material and weight can be saved in brake backing plates by making the plate itself of lighter gage and strengthening it at important points by welding reinforcing brackets to the plate.

Other tractor chassis parts being produced more and more by resistance welding include wheel rims (rolled sheet, flash-welded), drawbars, (flash-welding together several simpler forgings), etc.

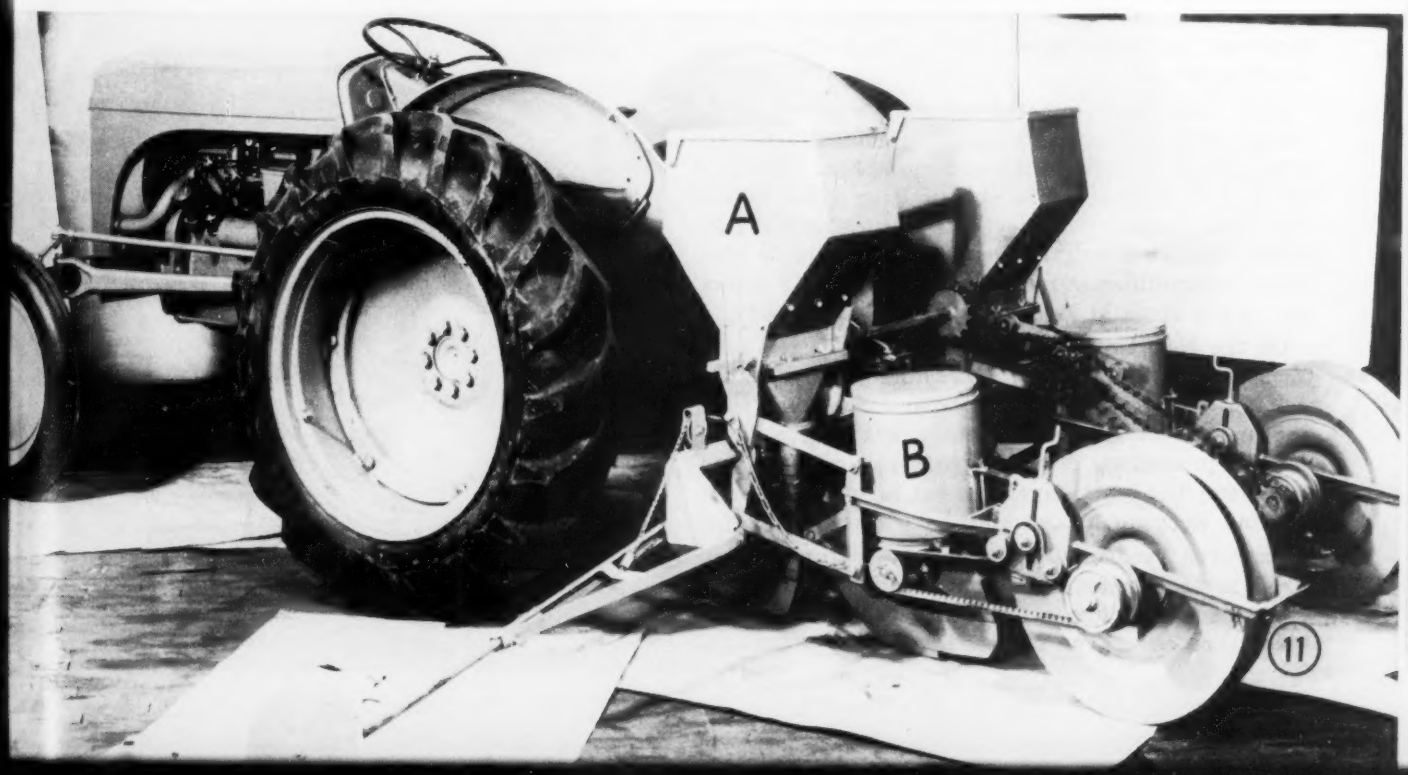
Cleaner appearance together with a one-third reduction in labor cost alone has been obtained by B. F. Avery & Sons Co., for its front tractor wheel. Fig. 7 shows the manner in which the reinforcement is spot welded to the wheel before the rim is attached. Another B. F. Avery wheel is composed of two identical cup-shaped steel parts, turned back to back and spot-welded together.

Caterpillar got quite a step-up in production when it switched to spot welding to attach reinforcing angle irons to its 3/16-inch thick brush guards. Here production used to be 2⅛ assemblies per hour. With spot welding, this jumped to 7½ complete assemblies per hour, using 20 spot welds a little over 3 inches apart. It used to take Caterpillar 10 minutes to straighten each brush guard after assembly. This has been made unnecessary, since the spot welded assemblies showed no tendency to warp during manufacture.

Sometimes the use of resistance welding has enabled manufacturers to change completely even the materials of which some parts are made. Thus the oil scupper, a part of the internal lubricating system used on IHC crawler tractors is made of two stampings and a hollow-machined part. To assemble the unit, the machined part is first projection welded to the scupper body. Then the center partition stamping is projection welded to the sides of the scupper body in one operation. The improved oil scupper actually cost 25 per cent less than the former design, due both to faster production and to lower materials costs, regardless of the fact that it is made of a larger number of parts.

Planters, Cultivators and Harrows — While the above indicates the diversity of uses of resistance welding in farm tractor production, the process is by no means confined to tractors. It has been finding its way into the production of all kinds of farm implements.

The fertilizer and grain hoppers shown at A and B on the Ferguson planter in Fig. 11 are typical spot-welded assemblies. The grain hopper is rolled to bucket shape from flat stock and spot welded with 14 spot welds to form the seam. Some 48 spot welds



are used in the fertilizer hopper. Ferguson applied the same principle to its manure spreader and found that they could use some 220 spot welds.

Both stronger and cheaper fabrication have been achieved by Massey-Harris on a seed can and cover. The hinge is now spot welded onto both units.

One hundred per cent of the non-demountable parts of the disk harrow made by Kelly-Ryan Equipment Co., are either spot or flash welded, for reduced cost and reduced fabricating time from raw material to finished product.

On plowshares, the Budd Co. is producing an extremely interesting design for Harry Ferguson Inc. This share consists of a forging—comprising the tip and gunnel, flash welded to a section of rolled plate steel. This produces an assembly having the desired metal characteristics for both sections of the share and is just as strong as a one-piece construction. Ferguson says they have been getting excellent performance with the design and have had no service failures of these plows to date.

Combines, Balers and Threshers — Standardized spot welding equipment has proved itself a real cost-cutter on such equipment as combines. Typical parts spot welded on the Oliver combine are the door, return pan, unloading auger tube, straw walker, grain elevator heads and the feeder beater. On the feeder beater alone, on which about 30 spot welds are used, the saving is $15 per 100 subassemblies. The auger tube adds another $5.20 per hundred. Return pans saved $6 per hundred for just a few spot welds, while savings on the straw walker were $66.72 per hundred. These of course are all straight manufacturing costs —costs which have to be multiplied several times in arriving at the delivered cost of the combine.

A combine designed from scratch with the idea in mind of producing it by resistance welding is the John Deere No. 12-A. This 6-foot unit is designed so that the material will move through the combine in a thin wide layer for maximum grain or seed savings and more efficient cleaning. The basic design however requires a wider body than usual and just about makes it impossible to use the conventional structural-steel angle-iron frame due to the heavy weight which would result.

Here John Deere adopted automotive principles of design and manufacture, assembling the main body in a master jig from just three subassemblies. All joining is done by fast-acting spot welding guns. With these the company achieved a surprisingly lightweight (for its strength) combine that could be produced in quantities at reasonable cost. Fig. 10 shows one of the steps in assembling this combine body.

On the New Holland baler a number of parts lend themselves to lower cost fabrication by resistance welding. Typical parts spot welded are the twine box and feeder bottom. Not only has spot welding doubled production of these parts per machine and man hour, but costs have been cut in two and twisting and warpage in assembly have been eliminated.

Improved Product—A typical part on threshers in which several improvements have resulted from adoption of spot welding is the tailings elevator on Red River threshers. The objective here was not to reduce costs but to improve the product. The new design, comprising nine parts assembled by 58 spot welds, is far stronger even though lighter than previously.

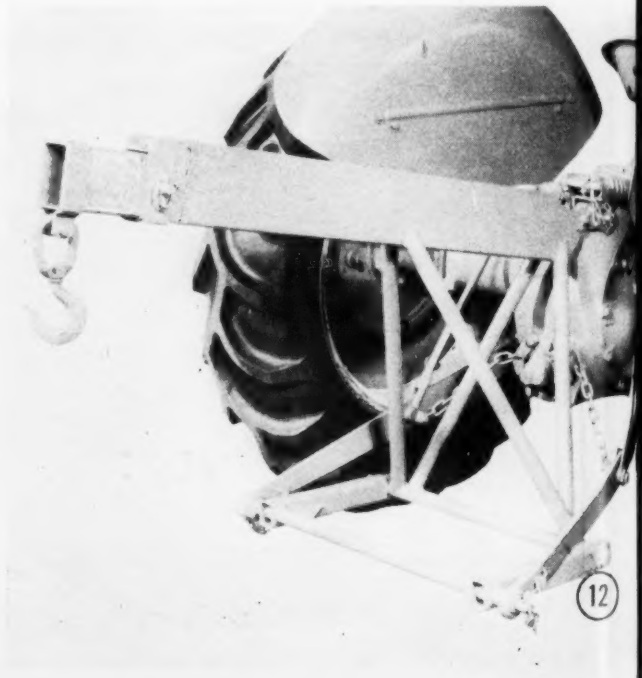
The Belle City corn-picker would probably cost several times its present price were it not for resistance welding. The process is used in 426 spots on the entire assembly, including the front elevator, pulleys and wagon elevator. Wherever possible, parts are simple stampings or formed sheet metal, spot welded for maximum strength and light weight.

The Ferguson utility crane, Fig. 12, represents an unusual use of resistance welding to produce a combination of high strength with light weight at low cost. The telescoping arm of this crane is composed of a sliding member riding in a box-section produced from two simple formed channels. One of these is a deep channel, the other is shallow. The shallow channel is spot welded with 50 spot welds inside the deep channel to form the box, as shown at right in Fig. 14. End of the sliding member is reinforced at the hook-support by 20 more spot welds as shown at the left in Fig. 14.

Other farm implements in which resistance welding is beginning to play a more important part in reducing costs and improving quality are: Spreaders, fertilizers, feed mills and mixers, seeders, grain dryers, elevators, etc.

Barn Equipment—One thing more should be mentioned in any discussion of farm equipment. Potential product improvements and cost reductions are not confined to "field" equipment. Stationary equipment in barns, etc., is also beginning to be produced by resistance welding today. Examples of specialized items of inherently relatively limited production are a milk storage and cooler tank, a milk bottle washing machine and a dust collector.

On the first, as produced by Heil Co. the housing is produced from formed stainless steel by seam welding—resulting in a bacteria-proof joint that is neat in appearance and costs little to produce. An inter-



esting part of the washer is the milk bottle pocket. This is produced by welding a series of wires together. Today, the welds are made on the simple machine shown in Fig. 13. Each weld takes only a fraction of a second to make, and the time and cost saving is sizable.

During the war years, J. I. Case, at its Rock Island plant, switched over virtually 100 per cent to resistance welding wherever possible on its products. Typical of J. I. Case products in this respect is the hammermill dust collector shown in Fig. 15. This unit is fabricated completely by spot and seam welding, there being over 200 such welds in the complete assembly, comprising 22 stampings and other parts. To assemble such a complex unit by other means, with equal strength, would require several times the number of man hours and probably would mean a much heavier and costlier completed unit.

Other "barn" items now produced by Brower Manufacturing Co. through resistance welding are a perch type feeder, a "Lay-mor" laying battery, an electrically-heated fount and a drum type oil brooder.

Parts Manufacturers—One development of considerable interest is that a number of stamping companies are today supplying various manufacturers of farm equipment with resistance welded subassemblies. There are several reasons for this: The resistance welded unit can be sold to the equipment manufacturer for less than he can make it himself by other methods. Finishing and painting of the assemblies is much simpler, since surfaces are smooth. Units are free from warpage and always "fit." Appearance is better, and strength is greater, other factors being equal.

Included in the products supplied by only one manufacturer to several important farm equipment producers are: Gas tanks, tool boxes, housings of various types, fenders wheel guards, and siimlar subassembiles.

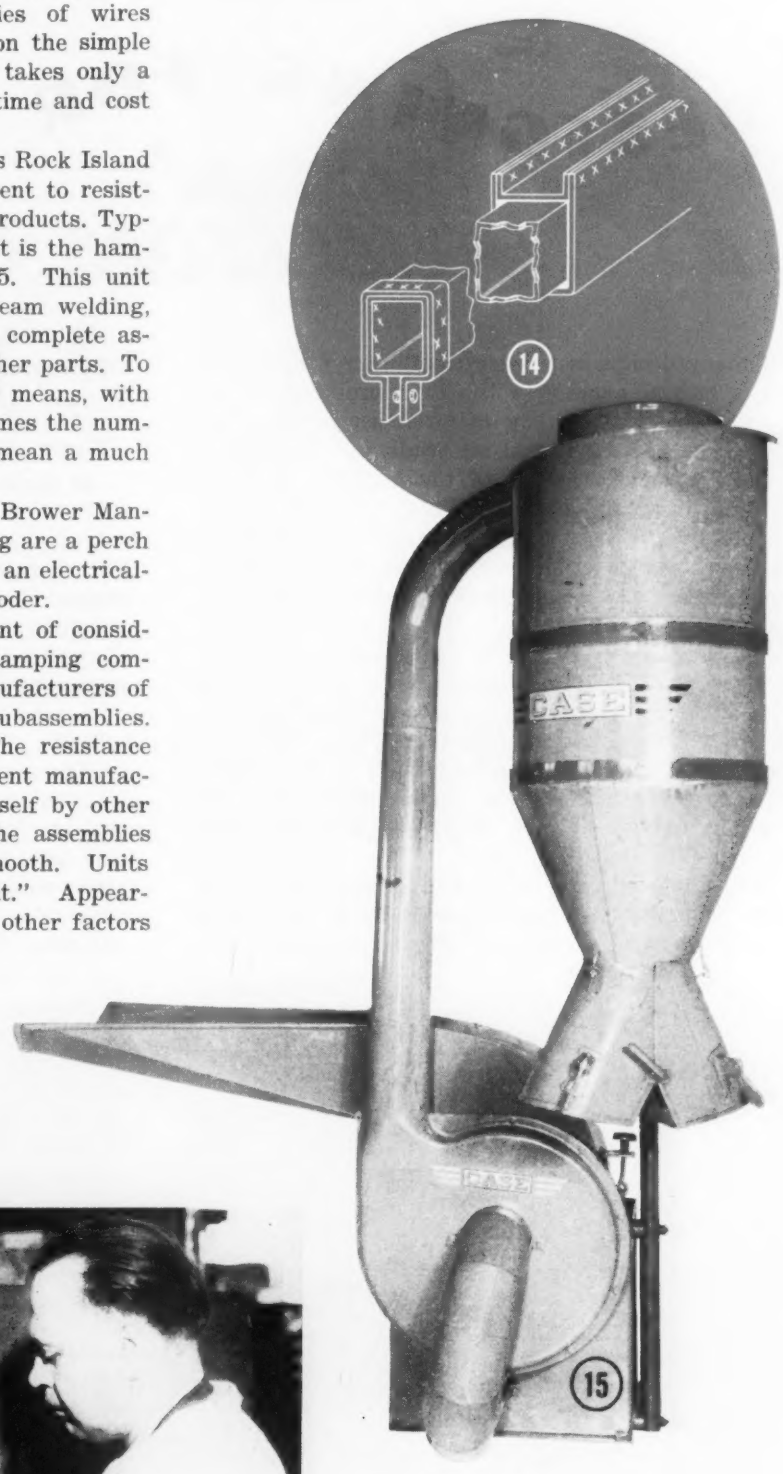


Fig. 12 — Tractor utility crane

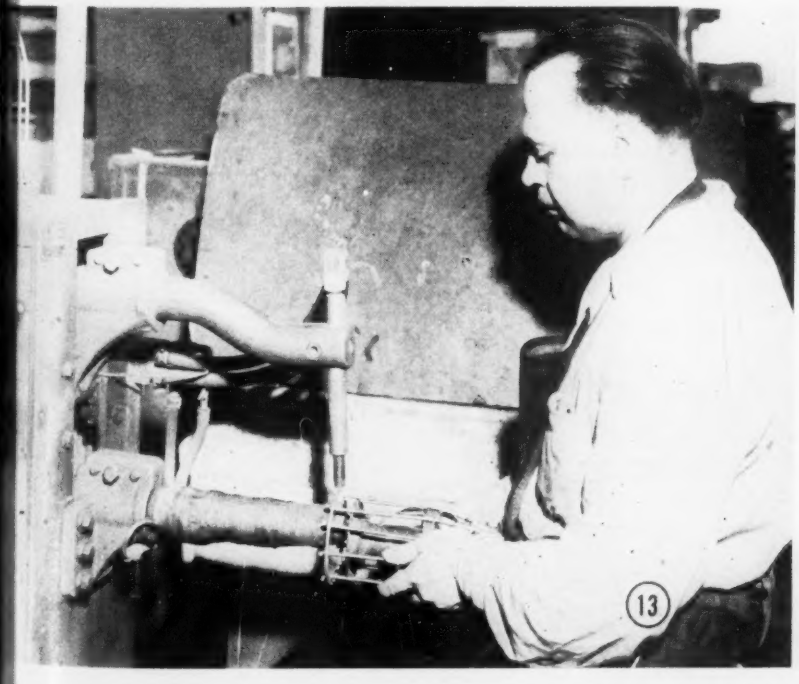


Fig. 13—Cross wire welding milk bottle washer pockets

Fig. 14—Utility crane boom showing spot welded construction

Fig. 15—Dust collector

DESIGNING FOR Production by Powder

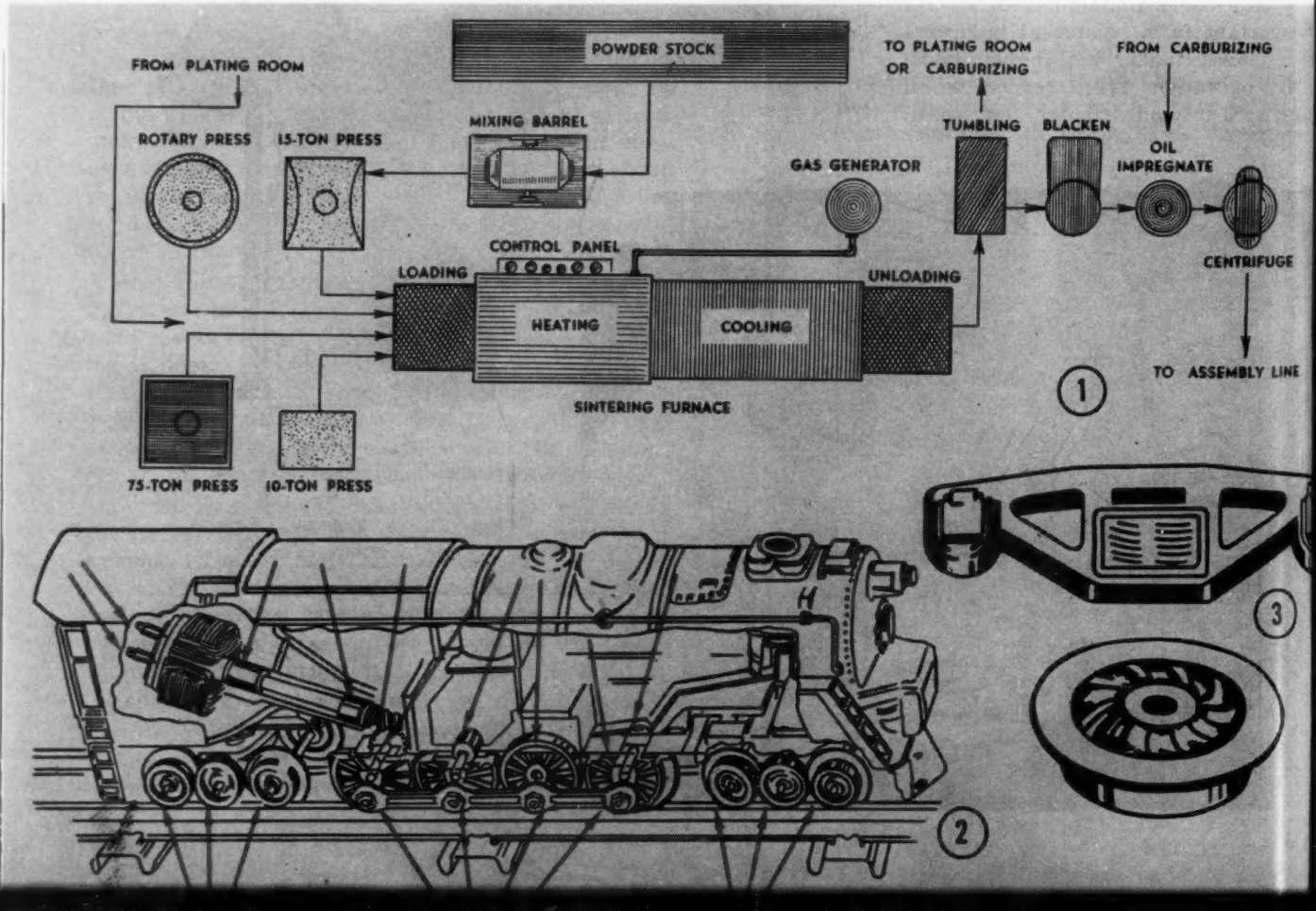
By taking advantage of powder metallurgy's economic and physical benefits, Lionel Corp. is now manufacturing many model train parts at sizeable savings in labor and material

FOR many designers powder metallurgy provided at least a partial answer to the twin problems of reducing costs and avoiding material scarcities. Compared to most conventional materials, the availability of metal powders was one of the brightest spots in the postwar supply picture. While, of course, powder metallurgy, is not a panacea for all designers' troubles, it is peculiarly well-suited for fabricating many small structural parts produced in large quantities.

Iron powder today is the cheapest material of construction, and in contrast to the general upward trend in the metal market, has maintained a constant price level. The quality of powder from all sources has steadily improved. Recalling the prewar demand for a "good 5-cent" powder, one might say that based on today's 60-cent dollar the goal has been achieved.

Parts produced from this material and many of its alloys have the lowest material cost and the widest range of physical properties. Except where such specific characteristics as corrosion resistance, a very low coefficient of friction or nonmagnetic properties are required, iron powder is the first material considered by the designer of compacted parts. By comparison with conventional methods of manufacture, powder metallurgy may well be called the "scrapless" method.

Although powder metallurgy is particularly well suited to mass production, experience has shown that even quantities of a few hundred pieces required for small production runs can be made economically by this process if tooling and set up costs are not unreasonably high. One such specialized "short run" application is the manufacture of plastic molds. Of



By JOSEPH BONANNO
The Lionel Corp.
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Metallurgy

course, some profiled parts are so well adapted to this method of production that even smaller quantities can scarcely be made economically in any other way. The truck side and wheel illustrated in Fig. 3 are examples.

Application of powder metallurgy to such products as porous bearings, contacts, welding electrodes, pivots, brushes, cutting tools, etc., is of course an old and highly successful story. These, however, might be considered as "standard" powdered metal parts and are used by most manufacturers in large quantities without particular reference to the method of their production. Since the writer's interests lie largely in the field of general manufacturing of consumer products the following observations will be confined to selection, design and tooling of pressed and sintered structural parts which heretofore have been made by more conventional methods, such as die casting, screw machining, stamping or assembly involving the combination of these techniques.

Conversion to Powder Metallurgy—An example of studied application of powder metallurgy to a toy locomotive is shown in Fig. 2. With the exception of brushes, all parts indicated by arrows are postwar applications of powder metallurgy. In all, 34 individual parts of this locomotive are now produced by this process. Naturally, not all of these changes were made simultaneously. The process of conversion to powder metallurgy has been one of gradual development over a period of 3 years as the method proved itself in successive applications. It should be added that because Lionel during the half century of its manufacturing history has collected a widely diversified assortment of fabricating facilities—including powder metallurgy—the selection of the method of manufacture in each case was based on a wealth of direct observation of competing processes.

Because of the volume of its production, running in the tens of millions annually, the compacted iron car wheel is probably the most significant single powder metal conversion in the toy industry. The entire product—that is the model train—was greatly improved by the lowered center of gravity due to

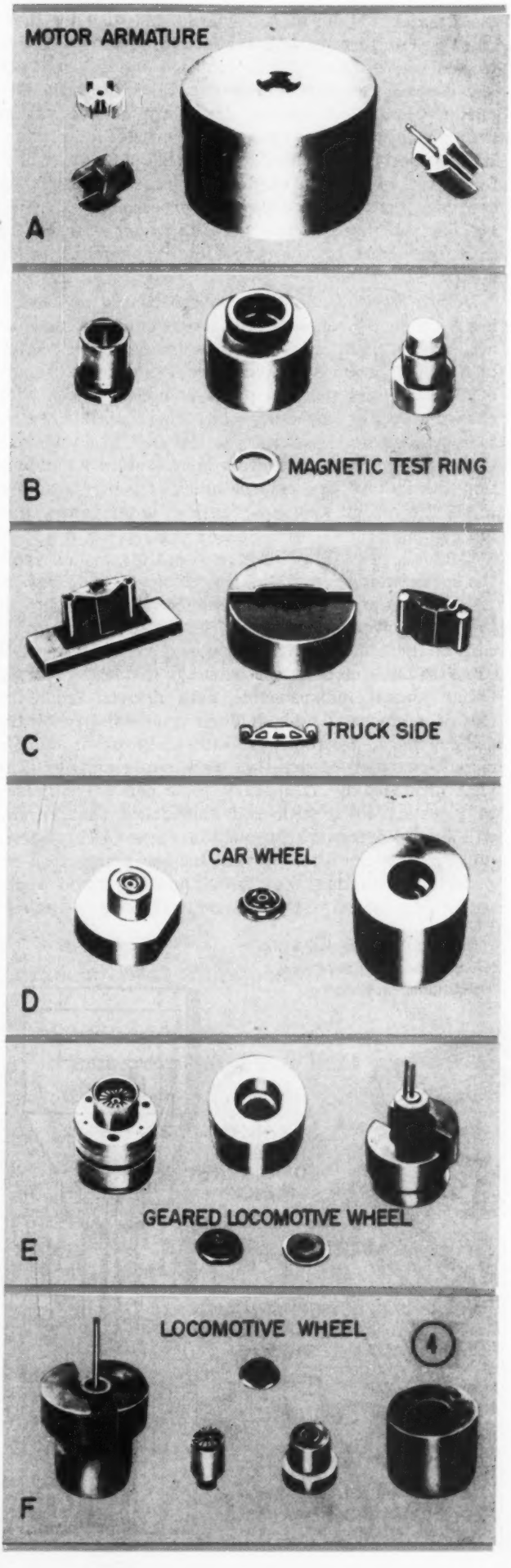


Fig. 1—Layout of Lionel powder metallurgy department

Fig. 2—Studied application of powder metallurgy to a toy locomotive

Fig. 3—Parts suited for short run powder metal production

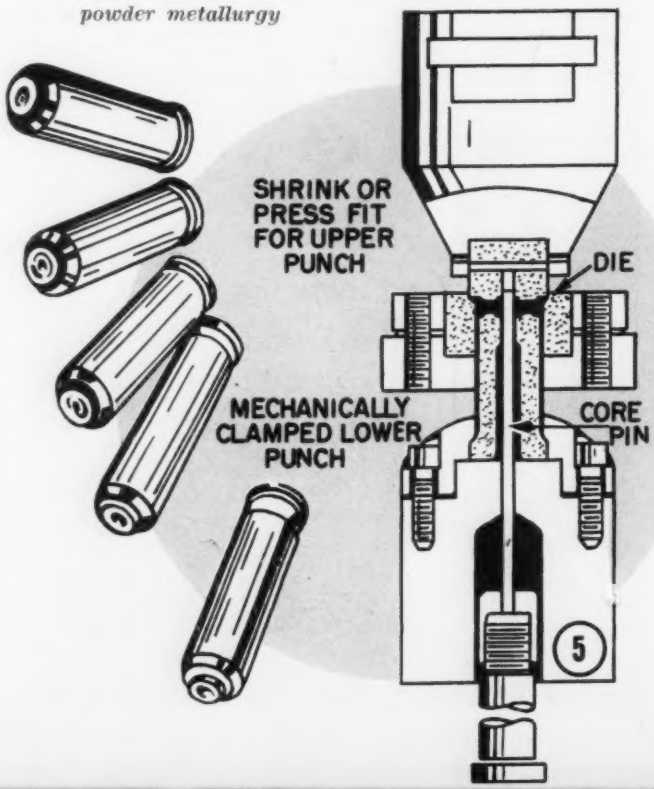
Fig. 4—Some temporary tools used for experimental applications

the greater weight of the wheels and also by their trueness, uniformity and realistic appearance. These wheels are ordinary black oxidized but where very low contact resistance is essential, as in radio frequency controlled trains, they are nickel plated through the use of a proprietary method of plating. In this method, the troublesome residual salts which formerly had to be leached out by repeated washings, are volatilized by an annealing process. Salts which are not volitilized at the annealing temperatures are first converted to volatile salts by chemical treatment.

Design Procedure—When in the course of designing a product it appears that a part could be made of metal powder the first step is invariably a sketch of a tool to produce the part. From that point designs of the part and the tool progress concurrently, with changes in one affecting the other, until a satisfactory part and a most practical tool are achieved. Consultations with machinery manufacturers and custom fabricators are helpful and frequently resorted to. If the design appears practical, a temporary tool is then made.

Common practice of making operating models from the specified materials and, if possible, by the identical production processes is nowhere more important than in powder metallurgy. First and foremost it can be determined if adequate physical properties are attainable not in test bars but in the part itself. Other almost indispensable data derived from the use of temporary tools include practicability of the design, most desirable powder composition, dimensional changes in pressing and sintering, etc. The part produced by temporary tools can be subjected to rigorous tests with full confidence that results will be valid for the production parts. Use of temporary tools can often prevent the scrapping of an expensive production tool since powder metal tools, unlike other process tools, cannot readily be altered.

Fig. 5 — Tungsten carbide tools used in powder metallurgy



In Fig. 4 are shown a number of temporary tools that have been built to study and evaluate the characteristics of proposed powder metal applications. Not all of these proposed applications have proved successful and thus the cost of expensive production tools is saved. For example, the armature body shown at A will require a great deal of development before the required magnetic characteristics can be attained. More will be said about this particular problem later.

It must be emphasized that temporary tooling and experimental procedure must be performed within the plant whether or not the eventual production will be farmed out to custom fabricators. In the first place, such work should be undertaken under the immediate supervision of the development engineer and secondly, no custom fabricator, however cooperative, can be expected to engage in numerous experimental projects of this nature.

In-Plant Powder Metallurgy Department—The prerequisites for setting up a special powder metallurgy department are the same as those for any manufacturing process: The volume of special powder metal parts used in the product must be sufficient to maintain a complete manufacturing unit working with a high load factor. Such conditions are met, for example, in the manufacture of wheels for toy trains, gear trains for clocks or similar mechanisms, caster wheels, etc.

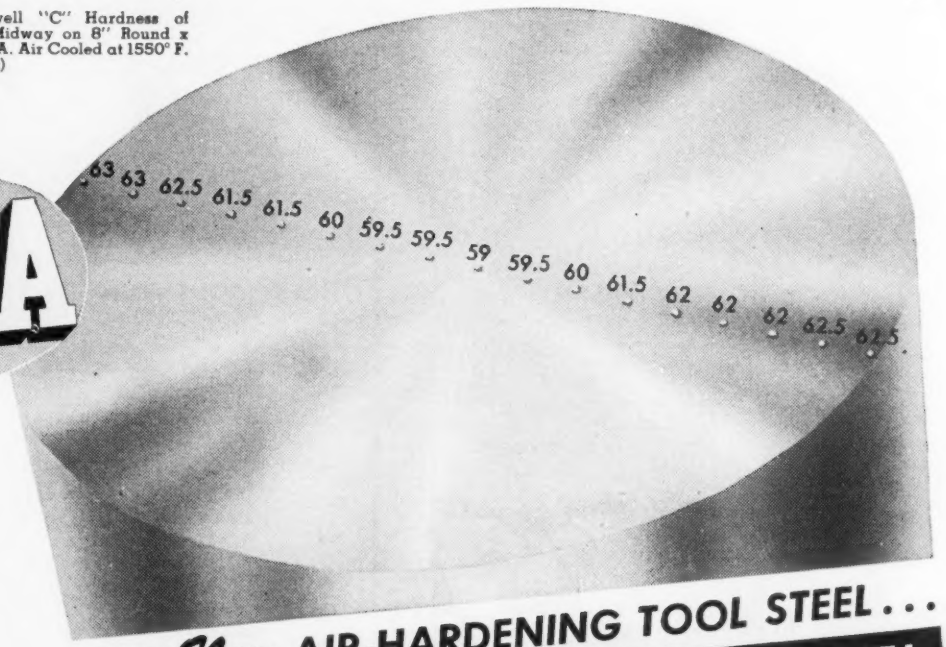
Besides the normal manufacturing profits, collateral advantages accruing from in-plant production are savings in the transportation, crating, handling and storage of finished parts, close inventory and production controls, and relative freedom to make changes in design to facilitate manufacture or improve product.

When other processes, such as hardening, annealing, plating, etc., are used in the manufacture of the product, they can often be most advantageously dovetailed with in-plant fabrication of powder metal parts, with consequent economy in handling and processing. Such handling economy occurs, for example, when gas carburizing or black oxidizing are used or where powder metal parts are plated by the previously mentioned process where interrupted sintering can be used to eliminate a pickling and several rinsing operations prior to plating, and the final sintering used to volatilize the residual salts.

Among the negative factors to be weighed in the establishment of a powder metallurgy department is the relative scarcity of experienced supervisory personnel trained in this field and able to keep up with its rapidly advancing techniques.

The sad experience of a number of manufacturers has shown that under no conditions should a venture in in-plant powder metallurgy be undertaken, unless the manufacturer has, or is ready to set up a small but well equipped tool room to maintain, replace and repair worn and broken parts on tools and pressing machinery. From our observation and for reasons that will be mentioned later maintenance in powder metal machinery is among the highest of all manufacturing processes, a factor which must be kept in mind when one is struck by startling differences in the cost of in-plant versus custom fabricated parts.

(Inside Rockwell "C" Hardness of Section Cut Midway on 8" Round x 15" Long VEGA. Air Cooled at 1550° F. 1 Hour at Heat)



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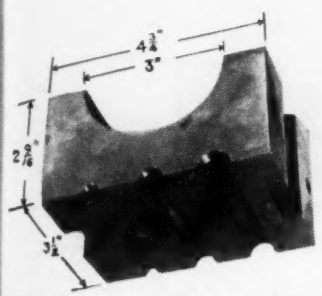
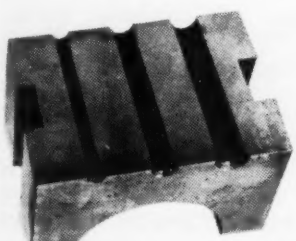


These chucking and forming dies, first made from an oil-hardening tool steel, "opened-up" .030"/.035" across the 3" diameter. To get minimum distortion in heat treatment, the tool maker changed to VEGA.



As a result, over-all expansion was held to .0004"/.0005"—with no evidence of warpage. And in the tool maker's own words, "VEGA machined in every respect as well as the oil-hardening tool steel previously used."

Hardening uniformly in very heavy sections from only 1550°F., VEGA cuts heat treating costs—makes special high temperature furnaces unnecessary. Its lower hardening temperature often enables you to eliminate expensive pack hardening to avoid excessive scaling. Moreover, VEGA gives you minimum distortion and size change, good machinability, resistance to decarb, freedom from excessive scaling and excellent toughness with good hardness.

Put VEGA's many advantages to work today on jobs such as blanking, piercing, trimming and forming light and heavy-gauge sheet metal. And for more information on its easy heat treatment and use, ask for the new VEGA folder. A note on your company letterhead, indicating your title, is all that's required.

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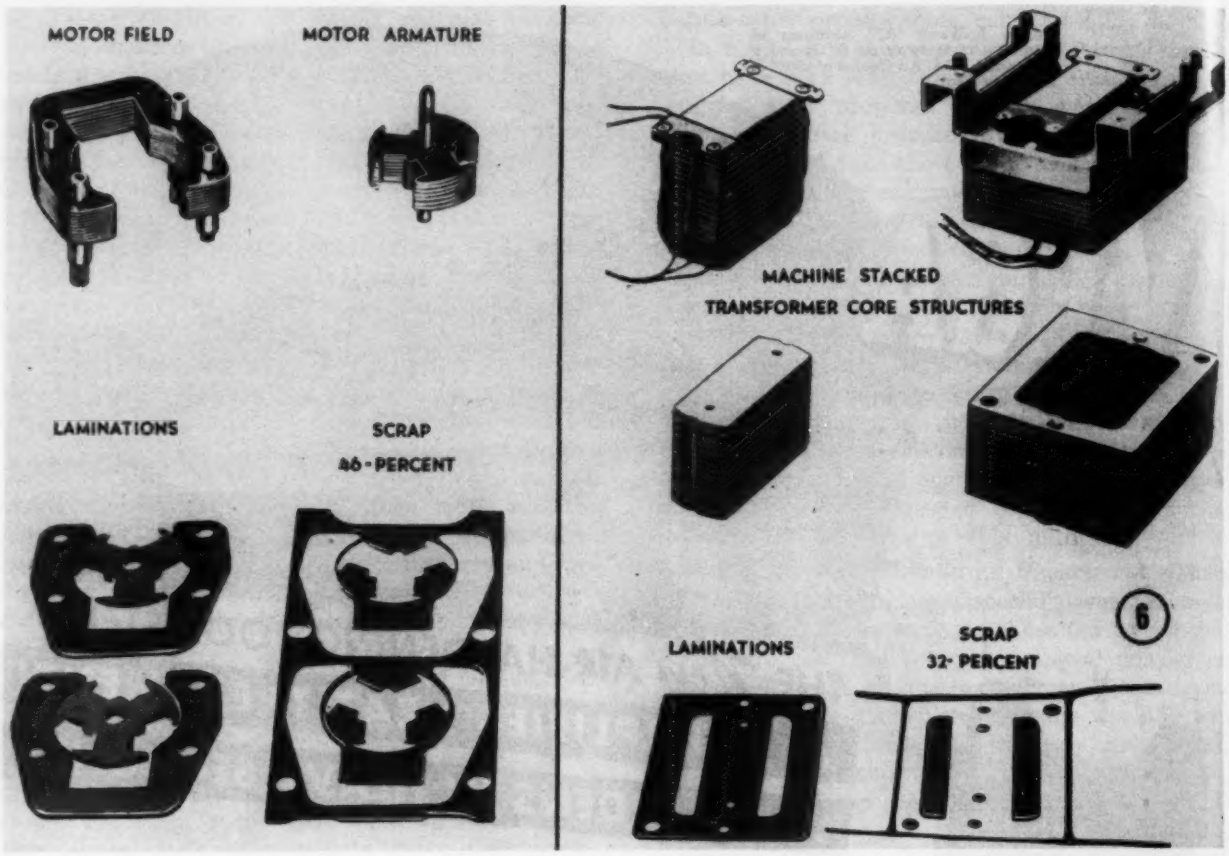

Fig. 6—Some laminated structures ideally shaped for powder metallurgy

Fig. 1 shows the layout of the Lionel powder metal department which fits in nicely with our requirements. The flow lines indicate the sequence of operations and interrelation of this department with other manufacturing processes.

Tooling for Powder Metallurgy—Once embarked on in-plant production the manufacturer must naturally consider powder metal tooling. In our experience tooling for simple pressed pieces requiring single punches at top and bottom, with or without core pins, seldom presents any problem other than educating the designers and toolmakers in the importance of close fits, mirror finishes and avoidance of drafts and fillets which allow powder to wedge between moving parts.

Material for the tool is determined by the length of the run. Over 250,000 iron parts can be produced on an average from tool steel dies before dressing, chrome plating or replacement of one or more components of the tool is necessary. Normally two such repairs are possible before excessive burr or change in dimensions throws the part out of the specified tolerance. It is a special characteristic of powder metal tools that any excessive wear becomes quickly apparent by the visual inspection of the piece itself.

When production runs of millions of pieces are involved, tungsten carbide dies will more than pay for themselves. At Lionel we make extensive use of carbide for dies, punches, and even core pins with excellent results. Careful attention must be given to the method of holding the carbide facing or tip to the tool steel shanks, as the high compacting pressures will at times break down an apparently perfect brazed joint. The best results have been achieved by eliminating brazing entirely and retaining tungsten carbide punch facings within the steel shank by shrink or press fit. Mechanical clamping of the lower punch, Fig. 5 is still in the experimental stage. At the left is a group of carbide tools for a rotary press.

Simple Pieces—While simple pieces present little tooling difficulty, the more complex parts which require sectional punches or present special ejection problems tell a far different tale. The powder metal process is relatively so new that no set tooling technology as in stamping or die casting has yet been developed. This fluidity is evidenced in the radically different concepts of tool construction which will frequently be suggested for the same part by competent authorities in the field.

Although complex pieces can be successfully pressed in temporary tools by alternate shimming and pressing of the separate punches, production tools frequently present a vexing problem that may well stump an average tool designer. Pieces requiring independent motion of various punches are properly made in multiple ram machines which are generally to be found at the better equipped custom fabricators, but the cost of which—$25,000 and up—is seldom economically justified for in-plant production. It is true that such multiple action can be simulated (when the die is clean) by an assortment of springs, cams, catches, etc., but such complex tools require careful watching for the first sign of drag which will result in varying fill and widely varying dimensions. In many cases it would be well to remember that discretion is the better part of valor and to turn over the tooling and production to the custom fabricator who has invested a small fortune in multiple action presses.

Generally speaking, we have found that in comparison with most stamping or die casting tools which produce satisfactory parts almost from the outset, complex powder metal tools require a much greater lead time. The reason for this lies partly in the inherent lack of plastic flow of metal powder requiring experimental adjustment of the tools, and

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That block or bar or rod of quality tool steel you received from Allegheny Ludlum . . . had to run the gamut of our vigilance committee right up to shipment time. You probably weren't here to watch the technically planned mill procedure, the laboratory controls, and the inspections—but you can quickly appreciate the value of our dozen or more quality safeguards, once the steel goes into service.

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This daily ritual of checking, testing, and inspecting at the various stages of production means that, in effect, we are operating our own "Bureau of Standards." By thus insuring quality, we protect you—the customer. You get better results.

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partly in the lack of flexibility of the present-day presses.

Machinery — Unlike die casting, plastic molding or metal stamping machines which primarily serve to bring together parts of self-contained, self-aligning dies, powder metal presses have a multiple functioin. They must keep the tools in alignment while exerting large forces which may have to be independently adjustable as to timing, stroke and intensity on the various tool components. The press and the tool cannot be dissociated but act as an interdependent combination. The immediate result is that the adjustment of the tool-machine combination is often a tedious experimental procedure. As a further consequence, the rigidity, alignment and wear of the press directly affect tool clearance and, of course, the life of the tool.

Expanding the Field—While even the present field of applications has barely been explored, research now in progress may soon open even greater opportunities for powder metallurgy. One such opportunity lies in the perfection of a technique for pressing magnetic structures operable at high flux densities at commercial power frequencies.

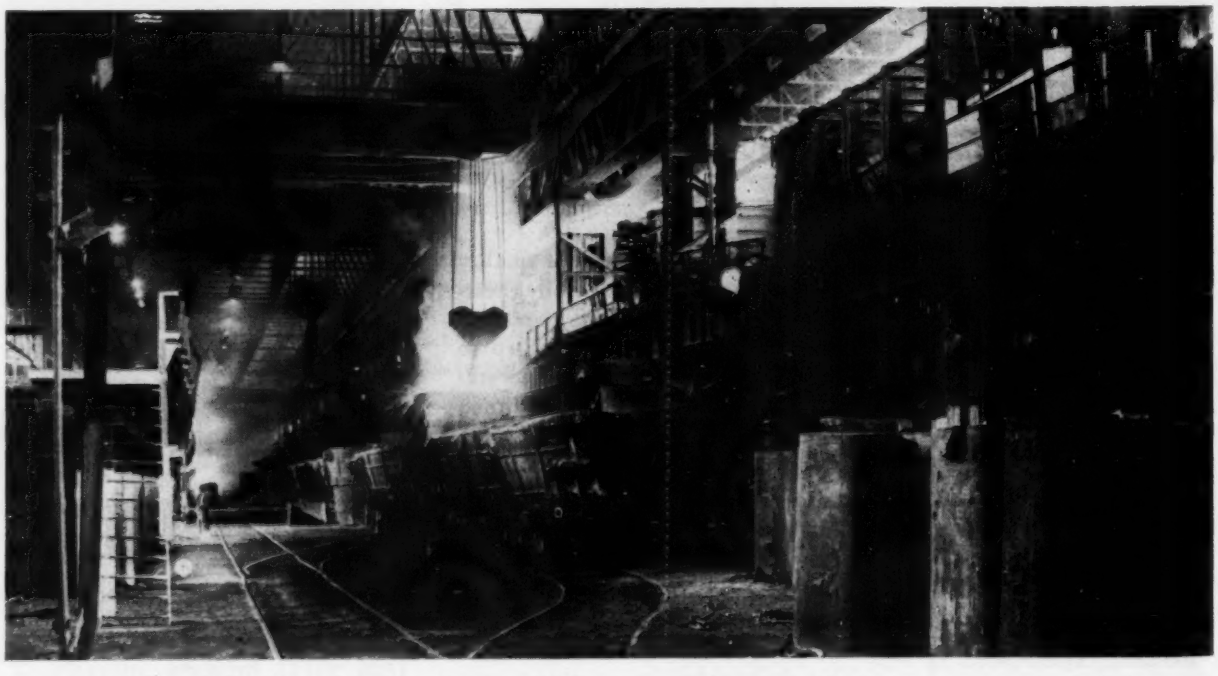
Although considerable success has attended the use of sintered parts for direct current motors, magnetic characteristics suitable for alternating current applications have not as yet been achieved. The metallurgical problem involves securing a dense structure of high resistivity and small equivalent air gap. These characteristics might be gained by developing large flaky powder to simulate a laminated structure having a high resistivity particularly in the direction of pressing. A short equivalent air gap would also result from the overlapping of flakes rather than the butting of rounded particles. Another possibility would lie in the direction of increasing the saturation limits of materials with extremely high resistivity, such as ferroxcube. Laminated structures, because of their uniform depth are ideally shaped for production by powder metallurgy.

A few typical examples of such structures are shown in Fig. 6. On the right are recently-developed machine-stacked transformer core elements. While this development eliminates much hand labor it does so only at the cost of increasing to 32 per cent the normally insignificant amount of transformer lamination scrap. At the left are field and armature structures for small alternating current motors. The scrap loss in blanking these laminations is 46 per cent. In making use of pressing technique the pole faces would be expanded to increase the area at the air gap and thus materially increase the efficiency of the magnetic circuit.

Aluminum Powders — Still another broad field for powder metallurgy awaits the perfection of a technique for pressing aluminum powders. Because of the difficulty of pressing this material and the ease with which aluminum is die cast, development of aluminum powder metallurgy has been rather slow. However, the advantages inherent in powder metallurgy coupled with the abundance and favorable weight-to-strength ratio of aluminum make the eventual combination of the method and the material almost inevitable.

Within a year two techniques were developed to minimize the tendency of aluminum powder to seize against the die walls—the primary source of difficulty. One of these involves use of specially processed material which does not require the admixture of a lubricant; the other, described in British patent No. 2,444,282 utilizes porous die elements and force feed lubrication to maintain a lubricating film on the die walls.

The extremely fine finish which can be transferred to pressed aluminum parts from the die would make this metal most desirable for decorative parts, hardware, keys, etc. Other applications of pressed



LIQUID FUEL FIRING: Three 230-ton tilting, two 250-ton tilting and two 100-ton fixed basic open hearth furnaces at the plant of Guest Keen Baldwins Iron & Steel Co., Ltd., Cardiff, Wales, are served by ground-type Wellman chargers for solid raw materials and overhead cranes for pouring molten mixer iron. All furnaces, previously fired by mixed coke oven and blast furnace gases, have been converted for liquid fuel firing. Average weekly production of the plant is approximately 11,500 tons

aluminum that could be mentioned include low friction bearings to conserve copper, high conductivity shading rings and lag rings for motors and relays and lightweight structural parts, particularly advantageous in aviation equipment.

From data presented by the author at the fifth annual meeting and exhibit, Metal Powder Association, April 5-6, Chicago.

Broaching After Assembly

INASMUCH as it was imperative that the V's on the opposite sides of typewriter carriage guides line up accurately, Underwood Corp., New York, resorted to the broaching of these Vs after assembly, even though one part is cast iron and the other steel. As worked out in co-operation with Colonial Broach Co., Detroit, some of the metal is removed in the first broaching operation, then a steel bar is attached and the two V's broached. Machine used is a 10 ton 72-inch stroke universal horizontal, with the double-toothed broach guided the full length of its stroke in the broach towers.

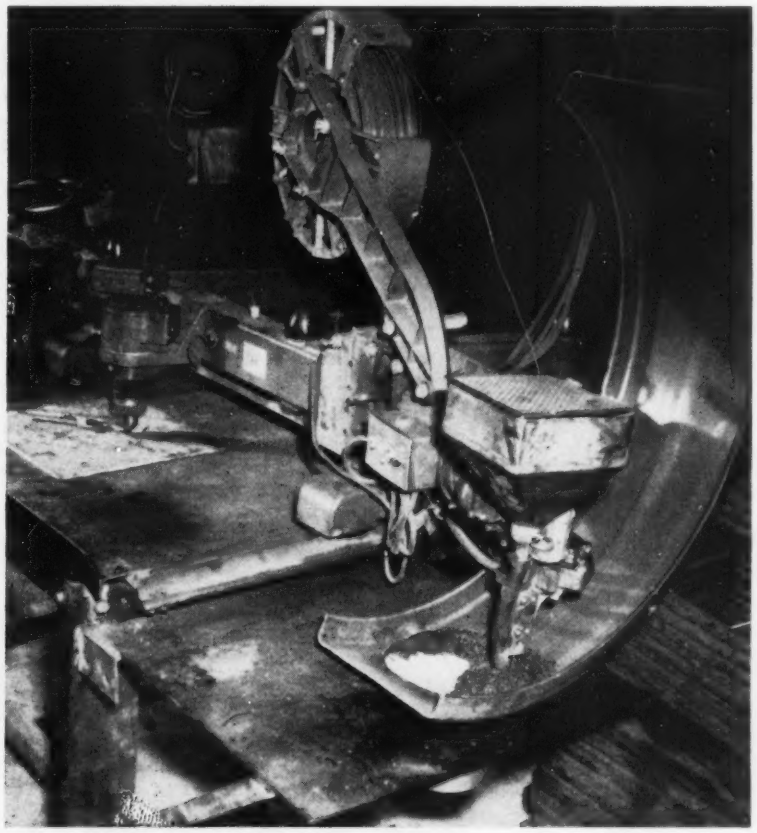
Fixture is designed to accommodate carriage guides for two sizes of typewriter carriages, one being 14 inches and the other 26 inches long. Either part is held in the fixture by cams, locating plungers and equalizing clamps.

It was found that the same hook could be used for the broach teeth on both sides of the broach in this operation, thus simplifying broach grinding. Prior to the final assembly and the broaching operations, the openings in the carriage guide are also broached to correct size and shape on another horizontal machine.

Care Affects Tool Life

SERVICE life of steel holders used with carbide insert tools depends, to a great extent, upon the care given them. Carboloy Co. Inc., Detroit, in order to help the users of such tools obtain maximum service life from the holders, is making four suggestions which will extend service life.

1. The chip breaker designed for machining steel should break the chip against an unturned work shoulder or on the side of the carbide insert, in order to protect the holder from gouging and abrasion. 2. To avoid difficulty in properly clamping the carbide inserts, the tool holder recess should be kept free from chips and foreign matter. Carboloy insert recesses are broached to close tolerances so that the inserts will fit snugly, yet may be removed and indexed easily. 3. Threads of clamping and adjusting screws should be kept clean at all times to guard against stripping. 4. Extensions on socket screw wrenches should not be used, nor should more pressure be exerted on the clamping screws than is actually needed to hold the carbide inserts firmly.



CIRCULAR WELD: The 10-inch diameter weld used to join a smoke pipe collar to the radiator shell of a hot air furnace is performed in about 40 seconds with this Unionmelt UE welding head attached to the arm of a shape-following carriage, designed by Linde Air Products Co., New York. An adjustable radius bar guides the tracing head in a circle of the proper diameter. An electronic voltage control takes care of the vertical difference by regulating rate of rod feed

Magnetic Testing Symposium

SOME of the new advances in magnetic testing and analysis are covered in a symposium on magnetic testing, published by American Society for Testing Materials, Philadelphia. With marked improvements in magnetic materials and the methods used to evaluate them, the symposium has as its purpose to take stock of the situation, indicate the progress made and to make it available to industry.

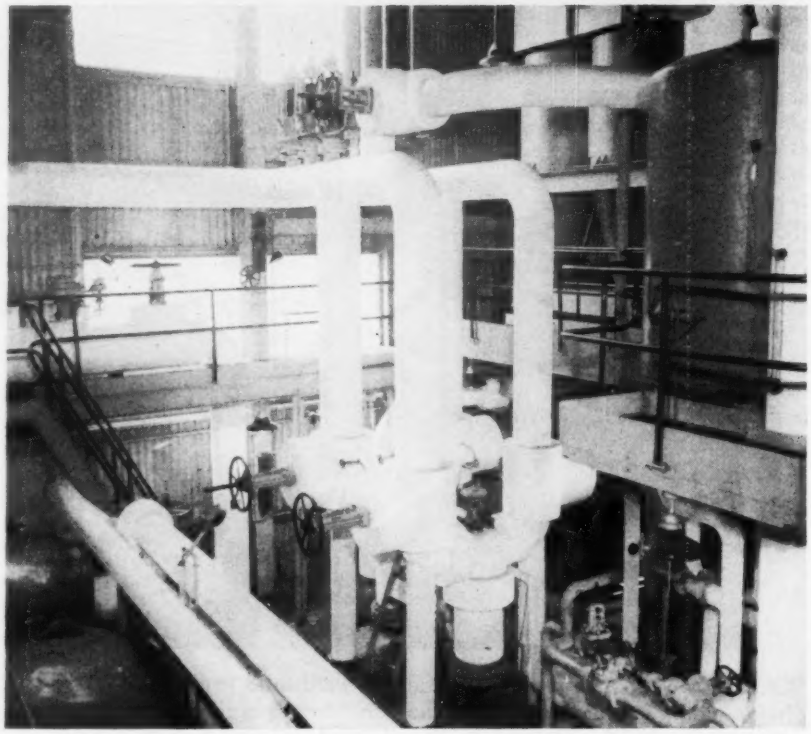
Ten technical papers by leading experts in their respective fields are contained in the publication. Some of the technical paper subjects are: Permanent magnet test methods and their validity in determining product performance, core loss test for narrow silicon steel strip, variation of core loss and permeability of electric grade silicon sheet steel, evaluation of hysteresis core loss by power equations and the testing of magnetic recording media. Copies of the 204-page publication are available from the society headquarters which are located at 1916 Race St., Philadelphia 3, Pa.

For Self-Propelled Cranes

A ONE-MAN, self-propelled mounting for all makes of cranes from 10-25 tons capacity is the Krane Karriage, made by Equipment Division of Keystone Driller Co., of Pittsburgh. Propulsion power is obtained through the travel clutches and vertical travel shaft of the crane. It is equipped with four-speed transmission with a speed range of from 2 to 10 mph in either direction. Entire machine is completely controlled by the operator from his seat in the cab.

Insulation Helps Increase

Steam Plant Efficiency



View in steam plant of John A. Roebling's Sons Co. showing desuperheater and reducing valve stations and auxiliary piping in center, water softeners at left and feed-water tank at right. All are insulated with 85 per cent magnesia

STEAM handling economy and operational safety are expected to result from the use of 85 per cent magnesia insulation in the new steam plant of John A. Roebling's Sons Co., Trenton, N. J. According to the company, a recently completed survey shows that due to greater efficiency of the new steam generating equipment, installed by Rust Engineering Co., Pittsburgh, an estimated fuel saving of $88,000 per year is expected. This figure does not include savings in labor, maintenance and supply costs.

Piping and equipment operating at temperatures up to 600° F are insulated with 85 per cent magnesia insulation in this plant which has a generating capacity of 240,000 pounds of steam per hour, supplied by three 80,000-pound-per-hour boilers. Where operating temperatures are higher, insulation consists of an inner layer of diatomaceous silica which resists effect of high temperatures and an outer layer of the magnesia material which has low thermal conductivity.

Fittings, flanges and valves are insulated with the same kind and thickness of insulation as specified for the adjacent piping.

Illustration shows desuperheater stations, reducing valve stations and auxiliary piping (center), water softeners (left) and feed water tank (right), covered with the 85 per cent magnesia insulation.

ASTM Holds Pacific Meeting

FIRST Pacific area national meeting of the American Society for Testing Materials, to be held in San Francisco, Oct. 10 to 14, will open with technical sessions on plasticity and creep of metals and fatigue of metals. The four papers that will be presented under the first-named subject include, "Experimental Exploration of Plastic Flow in Sheet Metals", "Application of Forming Criteria to Production Problems", "Use of Creep Data in Design", and "Super Creep-Resistant Alloys".

At the fatigue of metals session on Monday evening, Oct. 10, papers will be presented on: "A Broad Look at the Fatigue of Materials Field", "Fatigue Strength of Steel Through the Range from 0.5 to 30,000 Cycles of Stress", "Fatigue Notch Sensitivities of Some Aircraft Materials", "Fatigue Strength of Aircraft Materials and Fasteners". Tuesday morning, Oct. 11, will have the following papers presented at the dynamic stress determinations session: "A Survey of Pickups for Dynamic Physical Measurements", "Selection of Recording Equipment for Dynamic Testing", "Analysis and Interpretation of Dynamic Records", "Some Examples of Dynamic Testing in the Field of Materials and Structures".

Those concerned with quality control of materials and the application of statistics will hear three papers: "Some Economic Aspects of Vendor-Purchaser Relationships when Specifications are Statistically Unenforceable", "Precision and Accuracy of Test Methods", and "Use of Statistics to Determine Accuracy of Tentative Test Methods". This session is on Tuesday afternoon, Oct. 11.

Information on the properties and testing of cast iron, the significance of specifications for the materials and information of extensive uses of castings will be covered in a symposium on cast iron on Thursday afternoon, Oct. 13. Papers forming the basis for the symposium include: "Mechanical Testing and Properties of Gray Case Iron", "Development, Significance and Uses of Specifications for Cast Iron", "Automotive Cast Irons, Including Brake Drums", and "Applications and Uses of Gray Iron Castings, including Significance of Various Properties of Gray Cast Iron".

Chamfers 1000 Rods per Hour

CONTINUOUS automatic cycle on a special machine for the chamfering of connecting rods, built by Cross Co., Detroit, allows the operator to devote his time to loading the parts and pressing the cycle button. Designed for maximum automaticity, the machine unloads onto an automation conveyor for the next operation automatically.

Quality of the output, 1000 connecting rods per hour, is said to be assured by tool heads which align the work from the main bore for perfect concentricity and by single point carbide tool to generate the chamfers. Safety clutches for protection against improper loading and off-size parts are incorporated.

Pickling Combined with Galvanizing in

CONTINUOUS COIL GALVANIZING LINE

CONTINUOUS coil galvanizing line coating heavy gage hot roll strip of 12, 16 and 18 gage is now in successful operation in the plant of H. H. Robertson Co. in the Pittsburgh district. H. W. Lynn, Wean Engineering Co., Warren, O., pointed out at the 22nd meeting of the Galvanizers Committee in St. Louis recently that this unit is of special interest because it combines pickling of hot rolled strip coils with the galvanizing operation into one continuous operating unit, producing coils of galvanized strip.

Raw coils are uncoiled from a standard coil box and roller leveler, the leading end being fed into a shear for squaring. After spot welding one strip to the succeeding strip, the strip travel is continuous through the use of a looper car instead of a looping pit. The strip which has hot mill scale then passes through three pickle tanks containing sulphuric acid and operating at a temperature of 190° F for a total length of 180 feet. After the pickling operation, all the scale has been removed and the strip is washed with hot water before entering a muriatic acid bath prior to galvanizing.

Good Adhesion Provided—Standard design galvanizing rig of the Wean Titecote lead zinc process has a kettle measuring 7 x 14 feet. Capacity is 12 tons of galvanized strip per hour. The travel through the lead bath heats the strip prior to coating and gives excellent adhesion of the zinc, as the strip passes through the exit rolls, which are running in a bath of zinc.

Upon emerging from the exit rolls the strip passes upward approximately 40 feet and around a large diameter roll, this reversing the direction of flow for a distance of approximately 200 feet for ample cooling time before the strip enters an upcoiler. A shear is placed in front of the coiler for cutting the strip and removing the welded section. The average operating speed of this line is 50 fpm on 16 gage and production averages 10 tons per hour.

A special feature is the development of a stainless steel flux box, fabricated of type 316 stainless steel stabilized with columbium and ⅜-inch thick. This flux box has given unusual length of life, Mr. Lynn stated. He observed one unit in operation after use for six months.

Coiled material produced on the H. H. Robertson continuous pickling and galvanizing line is coated with zinc to protect the strip against rust during the cold forming operation and subsequent shearing operation producing fabricated steel floor beams. This coating also permits a good application of paint by the ultimate user of the fabricated product, it was stated.

High-Speed Line—Wean Engineering Co. has just completed the installation of another continuous light gage galvanizing line which consists of equipment for the proper handling of coils of cold reduced strip steel, welding succeeding coils to make a continuous ribbon for the processing operations at a maximum speed of 300 fpm.

This line is equipped with a vertical electric annealing and heat treating furnace and the necessary gas atmosphere equipment. The continuous coating unit is used in connection with facilities for either coiling on the line or cutting to length with a flying shear and piling the sheared material after inspection.

According to Mr. Lynn, the zinc coating of cold rolled strip steel by the electrolytic process has continued to expand and the units operating in this country are producing material up to 38 inches wide, 24 to 36 gage, at operating speeds ranging from 125 to 150 fpm, depending upon the electrical generator capacity. The product can be chemically treated or lacquered for many special applications such as bottle tops, closures, stoves and articles manufactured for display purposes.

School for Spray Painting

FEELING that the real problems of spray finishing are faced by factory executives and managers, salesmen and paint manufacturers, the Binks Mfg. Co., of Chicago, has established a school for educating foremen, supervisors, salesmen, jobbers and business executives in spray painting methods and equipment. Classes are being held during the first full week of each month, except July and December, at the company's plant from 9 a.m. to 4 p.m., Monday through Friday. The classes, limited to twelve, are to be composed of people with allied interests.

Students will acquire a knowledge of manufacturing methods and operations, showing how spray painting equipment is made. Besides having a course in the construction of spray guns and their operation, the class members will become acquainted with automatic spray finishing machines, stationary and portable air compressors and allied equipment. Classes are also instructed in the practical operation and details of various types of spray booths, material tanks and other spray painting equipment.

Sine Tables to 15 Places

DIFFICULTY of obtaining high-accuracy tables of sines and cosines with decimal subdivisions of a degree has been a source of inconvenience to workers in such fields as optical instrument design, ballistics, rocket research, and aircraft design. Meeting the need for such tables is a 95-page booklet of tables of sines and cosines to 15 decimal places at hundredths of a degree, issued by National Bureau of Standards and available from the U. S. Government Printing Office, Washington 25, D. C.

Designated as NBS Publication AMS, 5, it has the tables with columns of sines and cosines arranged side by side for convenience in cases where both the sine and cosine functions are desired for the same argument or where Taylor's theorem is to be used for interpolation. Alongside the tabular entries are presented the second central differences, that are sufficient for interpolation to the full 15 decimal places.

Offers Valve Selector

VALVAIR Corp., Akron, O., is offering gratis a valve selector to enable usere o order valves more easily. Code numbers for over 35,000 standard valves are given and a price calculator is also available. Knob, lever, foot, cam, treadle, cylinder, diaphragm, and tandem-operated valves as well as solenoid valves are found on the selector.

FUNDAMENTALS OF STEELMAKING

NUMBER **11** OF SERIES

Another in a continuing series of articles on the making of steel and finishing it into products ready for the consumer. Each article is written by an outstanding authority in his particular field.

Production of Structural Shapes *and Rails*

In this first section, the authors describe three successful and efficient structural mills used today. Also considered are the duties of the roller and roll designer in the successful production of many intricate sections

By FREDERICK M. GILLIES
Works Manager
and
WILBUR E. DITTRICH
Superintendent, Blooming, Structural and Rail Mills
Inland Steel Co.
Chicago

PART I

STRUCTURAL shapes may be defined as steel bars of various cross-sectional contours, used in the construction of bridges, dams, cars, ships, cranes, and machinery. Shapes down to 3 inches are ordinarily considered as structural shapes, while smaller sizes are commonly referred to as bars. Standard structural sections are listed as follows: Angles, channels, ship channels, I-beams, Z-bars, and car sections. In addition special shapes are offered, among the more prominent of which are: Piling bars, Z-center sills, bulb angles, wide flange sections, girder beams, H-beams and various sections for agricultural machinery. Standard shapes are furnished in sufficient variety, sizes and weights to meet most needs. Extremely large sections are often specialties and made by particular companies. The widest section produced is a beam 36 inches wide weighing 300 pounds per foot. Heaviest H-beam produced is an 18¾ x 16¾-inch overall flange weighing 426 pounds per foot. Diagrams of typical shape sections are shown in Fig. 1.

Mills used in the rolling of shapes vary widely and each is usually devised to suit particular local situations and facilities. For the purpose of this discussion a description of three successful and efficient structural mills is given.

Fig. 3 shows the arrangement of a 28-inch structural and rail mill. Mill size, expressed in inches designates the distance between centers of the driving pinions. In the case of mills producing flat-rolled products such as sheet, strip or plate, mill size refers to width of the roll body. Steel is usually processed in the following stages: The cast ingot from the open hearth is reheated in soaking pits and then rolled on a blooming mill into blooms, bloom shapes, or slabs; these semifinished products are then reheated at the finishing mills and rolled into the finished product. In the case of the 28-inch structural mill being described, the preliminary rolling is done on a two-high 40-inch reversing blooming mill. A view of this mill is shown in Fig. 2. Bloom sizes ranging from 7 x 6 inches to 13 x 10 inches are rolled on this mill in 17 to 23 passes and furnished to the structural mill for final rolling. After blooming, the next operation is to remove or crop approximately 10 to 15 per cent of the top portion of the ingot to ensure sound steel. The crops are collected and sent back to the open hearth for remelting. After cropping, the remainder of the bar is cut into bloom lengths calculated to provide sufficient weight to yield the predetermined length of finished bar to be produced. Bloom sizes and lengths used, depend on the section being rolled, reheating furnace dimensions, pass design, mill arrangement, and length multiples of finished bar to be

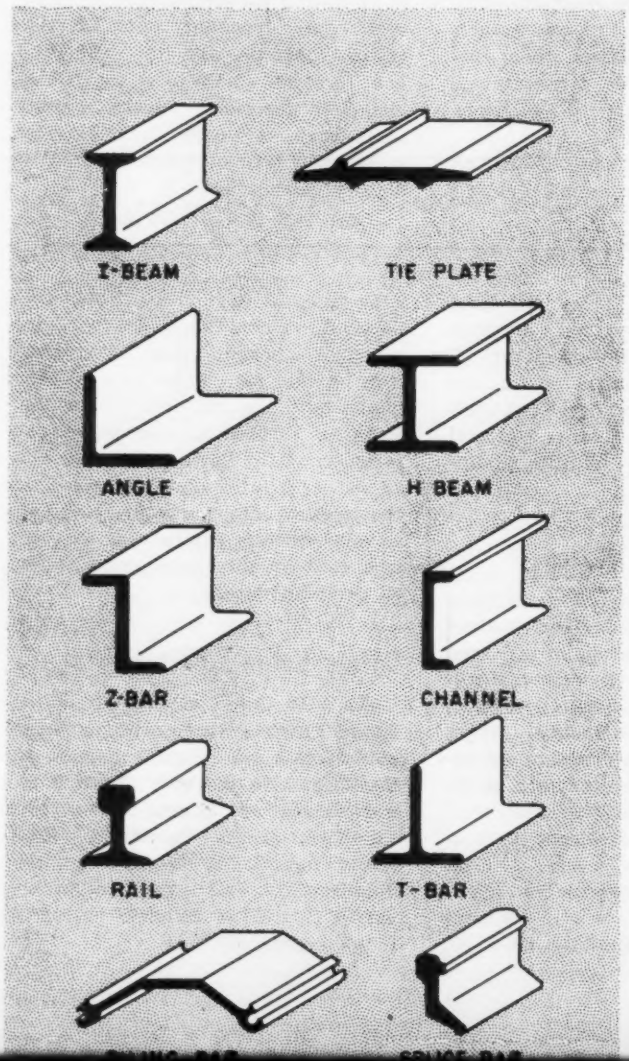


Fig. 1—Diagrams of typical structural shapes

produced. In the case of I-beams from 15 inches and larger in depth and also on most piling-bar sections it is necessary that shaping be started in the blooming mill to permit the rolling to be completed in the structural mill. When bloom shapes are being rolled, specially shaped shear knives are also required. Again referring to Fig. 3, after shearing, blooms or bloom shapes proceed down a line of table rolls to reheating furnaces where they are charged into the furnaces. Three reheating furnaces serve the subject mill and are of the continuous type. It will be noted that the blooming mill table line continues and leads to a 24-inch continuous billet and slab mill which rolls these products directly after blooming with no intermediate heating. This is called direct rolling.

It is usual practice, however, to reheat blooms prior to rolling in the structural mills. Fig. 4 shows a diagram of a continuous reheating furnace most widely used. This furnace is charged from the back and the entire hearth covered with steel for rolling. Delivering of steel from this furnace is accomplished by pushing the entire charge forward from the back by electrically driven pushers. The charge is pushed sufficiently forward on signal for one bloom to be dropped from the front of the furnace onto the table line leading to the mill. These furnaces are equipped with two or three banks of burners depending on the heating capacity needed. Front burners are set to heat the steel on the furnace hearth; bottom burners heat the underside of the charge just back of the hearth. Roof burners are set to heat the charge behind the zones of the top and bottom burners. These furnaces have the advantage of high heating rates and ease of operation with either oil or gas used as fuel. Heating capacity ranges from 25 to 100 tons per hour. Automatic optical pyrometers are often used to aid the furnace heater in obtaining satisfactory heating. Steel is delivered from the reheating furnaces at temperatures ranging from 2000 to 2250 degrees F. Another type of reheating furnace known as a hot-bottom furnace is used in some mills. This is a regenerative furnace fired alternately from either end. Blooms are charged and drawn by machines through the furnace doors. This furnace has the advantage of very uniform heating but is limited in capacity. The continuous type of furnace is more widely used.

After reheating, the bloom is passed down a table line to a 32-inch two-high reversing roughing mill, see Fig. 5, which is ahead of and in line with the roughing stand of the 3 stand three-high, 28-inch mill. The bloom receives five to seven passes in the breakdown mill and then proceeds to the 28-inch mill. Three housings are set laterally in this mill, see Fig. 6. The roughing stand is on the drive end, the intermediate next, and the finishing stand in last position. Roughing and intermediate stands are three-high mills, while the finishing is ordinarily two-high. The mill is driven through three pinion gears operating in a closed housing. Power from a 3200 hp motor is transmitted to the middle pinion gear through a spindle. The roll ends are cast with segmented pods known as wabblers. The rolls are connected to one another by cast coupling boxes held in place on the connecting spindle by wooden stretcher-blocks. The power is connected through pinion gears to the rolls with one roll driving the next. The mill is operated with the rolls turning in one given direction. Several arrangements of pass distribution in the finishing mill are possible. Bars from the 32-inch roughing mill ordinarily receive six to eight passes in the finishing mill. Distribution of passes in the stands is usually based on roll economy and efficiency of production with these factors varying from section to section. The bar is handled at the finishing mill by traveling tilting tables which enter and receive the bar as well as transfer it from stand to stand. There are four such tables serving the mill. The mill has proved efficient and several of this type are now in use. One great advantage of the arrangement lies in the use of the separate low-speed 32-inch breakdown mill for heavier drafting and the high-speed drive for lighter drafting in the finishing mill. One improvement which has been made to some mills is the addition of a separate drive for the finishing stand which allows for higher operating efficiency on some

Frederick M. Gillies was born in Chicago in 1895. He received his degree from Cornell University in 1918 and following graduation served in the United States Navy during World War I.

He was first employed as a foreman at the Illinois Steel Co. from 1919 to 1922. Following this he became plate mill superintendent at the Inland Steel Co., which position he held from 1923 to 1933. The same year he was advanced to assistant general superintendent of the company and five years later became general superintendent. In 1946 he was elevated to works manager, the position he holds at the present time.

Mr. Gillies is a member of the governor's work program committee for the state of Illinois, American Iron & Steel Institute, American Institute of Mining and Metallurgical Engineers and the Association of Iron & Steel Engineers.

Wilbur E. Dittrich was born in Indianapolis in 1903. He received his Bachelor of Science degree in chemical engineering from Purdue University in 1925. His first employment was as a metallurgist at Inland Steel Co. which position he held from 1925 to 1933. Following this he was advanced to general mill foreman in charge of the blooming, structural and rail mills. In 1947 he was appointed assistant superintendent of the above mentioned units and in 1948 was named superintendent, which position he holds at the present time. He is a member of the American Iron & Steel Institute and American Institute of Mining and Metallurgical Engineers.

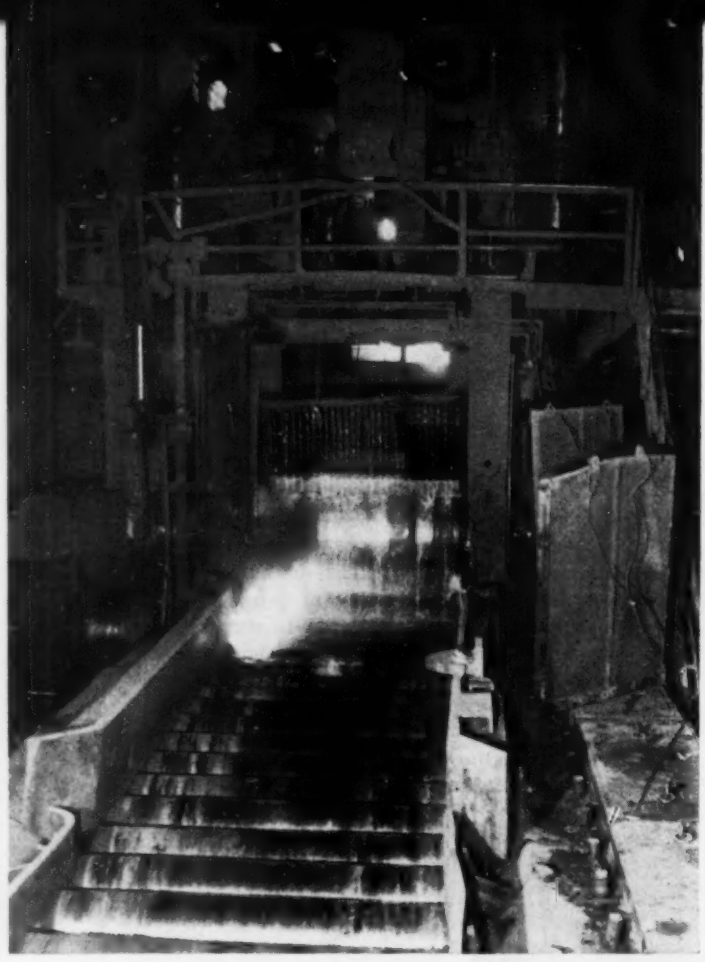


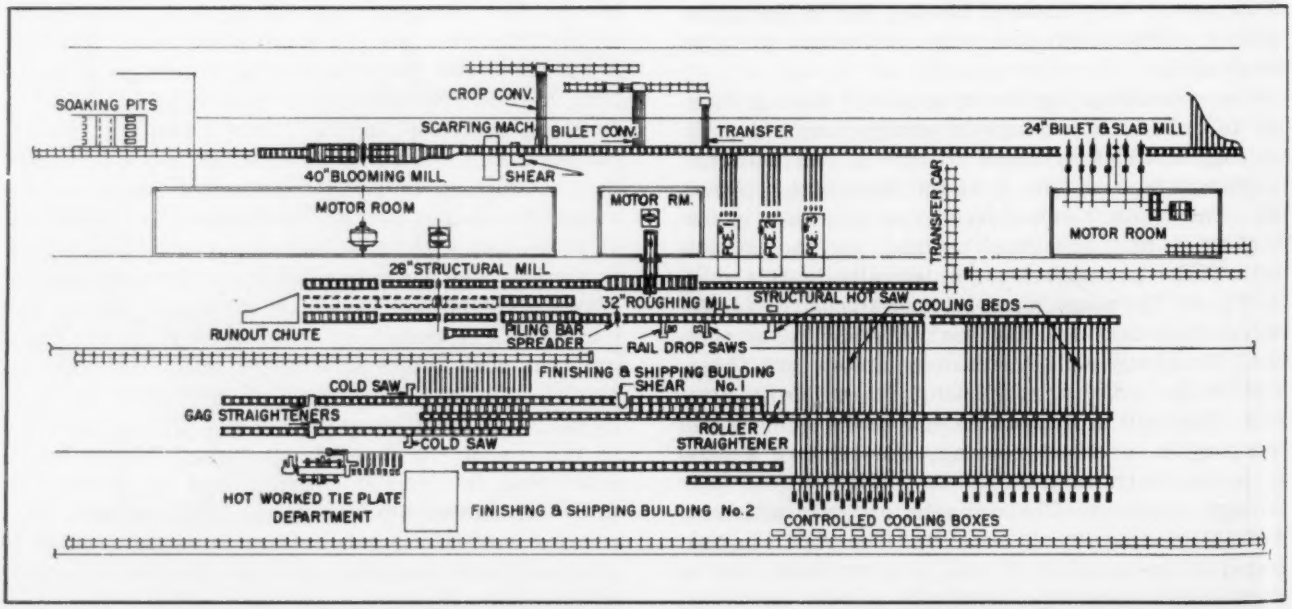
Fig. 2—Two-high 40-inch reversing blooming mill

sections. A separate finishing drive delivers the long bars out of the last pass faster and thereby releases the entering table sooner to receive another bar from the leader pass. This original conventional 3-stand mill is capable of rolling a wide range of products and sizes. Angles from 6 x 3½ inches to 8 x 8 inches, 7 to 24-inch I-beams as well as rails, piling bars, Z-center sills, tie plates, splice bars, etc. are commonly rolled. Rolling rates range between 50 and 100 net tons per hour.

Fig. 7 shows a side view of the mill housing and is presented to show the manner in which the rolls are supported and regulated in the housing. The bottom roll rests on a bearing, the level of which may be adjusted by bottom screws. Position of the middle roll is made fixed and stationary by resting the middle carrier bearing on shelves on the housing. The top roll is positioned by providing liner space between the middle roll rider bearing and the top roll carrier bearing. The top roll is held in position by head screws in the housing cap. Lateral adjustment is afforded by set screws which act on the back sides of the bearing thrust collars. Rolls used in this mill are 68 inches wide and 29 inches in diameter. The assembled housing weighs approximately 90 tons. Several spare housings are maintained and these are built up with the ensuing section during current rolling. When an order is completed, the rolls are disconnected and the entire housing is lifted from the train and other housings built up with new rolls are set in place. The 32-inch breakdown mill rolls are changed at the same time. An entire roll change requires about one hour.

Layout of another typical structural mill is shown in Fig. 8. This is a 24-inch bar mill and is used for rolling smaller shapes of the following sizes: 4 x 3½-inch to 6 x 3½-inch angles, 4, 5, and 6-inch I-beams, 5 to 9-inch standard channels, 6 to 7-inch ship channels, 7-inch side frame channels, and 3 to 6-inch Z-bars. Numerous other special miscellaneous shapes are also rolled. There are four two-high mills in this train which may be driven from either end. Usual practice is to drive the No. 1, 2, and 3 stands with the roughing-end motor and the finishing stand by the finishing-end motor. The motors are of the 3000 hp reversing type. The No. 1 universal mill is used for roughing both structural shapes and plates, the No. 2 mill is used for rolling universal mill plate and is ordinarily by-passed when rolling is

Fig. 3—Arrangement of 40-inch blooming, 32-inch roughing, 28-inch structural and 24-inch continuous billet and slabbing mills



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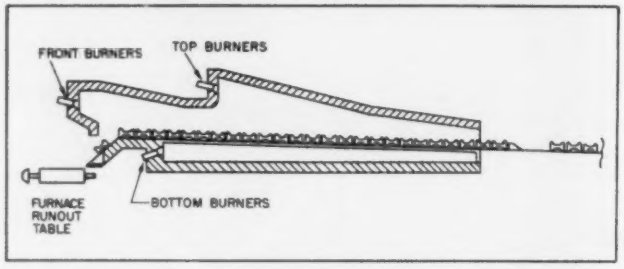
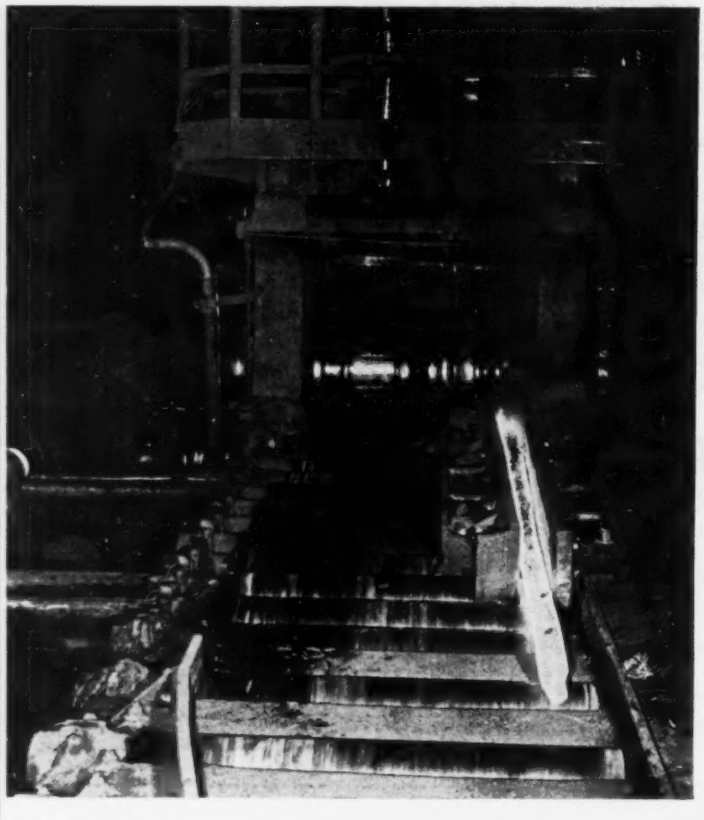


Fig. 4—Diagram of a widely used continuous reheating furnace

carried on and finished in No. 3 and 4 stands. No shape contours are developed until working in the No. 3 stand. This mill is served by a 36-inch two-high reversing blooming mill and rolls blooms from a 22 x 24-inch ingot weighing approximately 11,000 pounds. Bloom sizes range from 5 x 4 inches to 9 x 7 inches. Blooms up to 12 feet in length are charged into two continuous reheating furnaces which serve the structural mill. After reheating, they pass down a table line to the roughing stand where they receive three passes, are transferred to No. 3 stand where four passes are made; next to the finishing stand where the final one or two passes are made. The bar is transferred from one stand to the next by means of traveling dogs over transfer beds. Shapes are normally rolled from the bloom in nine passes although as few as seven are used on some sections. The No. 1 stand is the universal mill, so designated because vertical rolls are provided for edging the bar in rolling universal mill plate. This commodity is rolled entirely in No. 1 and 2 stands. Plates ranging from 6 to 26 inches in width and ¼ to 4½ inches in thickness are rolled on this mill. Two hot-saws are provided to cut the bars to length after which they pass on to the hot bed for cooling. A distinct advantage in the operation of this mill lies in the arrangement which permits universal plate rolling to be carried on while changing No. 3 and 4 mills from one shape section to the next. The mill produces about 300 net tons per 8 hour turn. A seven-roll cold straightening machine is used for final straightening of shapes.

Fig. 5—Two-high 32-inch reversing roughing mill



Still another mill used for rolling smaller structural bars is the cross-country mill. Arrangement of a modern mill of this type is given in Fig. 9. Structural shapes of the order of 3 to 6-inch channels, 3 to 5-inch beams, 2 to 4-inch angles, numerous bars such as rounds, squares, hexagons, flats and the like are rolled in large quantities on this type mill.

The arrangement is capable of high production rates since it is possible to have several bars in the mill at a given time, however, bars must be passed singly through progressive stands. Drive speeds increase from roughing toward finishing with the slow speeds and greater draft taking place in the roughing stands. Speeds become progressively higher as drafts become lighter and the bars become longer toward the finishing end. Lengths are restricted to distance between mills and rolling temperature limitations. Billets ranging in size from 4 x 4 inches to 6 x 6 inches are reheated before rolling on this mill. Units in the illustration are all two-high mills.

Proper setting of the rolls both vertically and laterally to produce the proper drafting from pass to pass is the responsibility of the roller. If balanced drafting is not obtained, section difficulties such as overfills, underfills, laps, short flanges, and buckles may result. The skill and experience of the roller in recognizing and quickly correcting such faults is most important in securing efficient operation and good finished sections. Many other rolling characteristics or behaviors of the flow or forming of hot steel through or in various types of passes must be taken into account both in designing the rolls and in setting the passes. Here again skill and experience are imperative.

In the hot rolling of steel, and particularly in shape rolling, guides must be provided to lead the bar into the pass and also to deliver it from the pass. The guides must conform to the sectional shape and design to accomplish their purpose. Side guides anchored to rest bars, positioned in the housing, serve to lead the bar into and out of the passes. These must be properly positioned to prevent the entering bar from turning down or running under the roll collars. On the delivery side they serve to keep the bar in reasonable alignment and to deliver it so that the receiving table has no trouble handling the product. Pass guides, ordinarily consisting of flange and web guides, are also supported by the rest bars and held against the roll by weights. Pass guides serve principally to prevent the bar or a portion of it from following or collaring the roll. They are particularly necessary in closed passes, i.e., pass recesses wherein the recess is contained in one roll only. This is contrasted to open passes where two rolls are turning in

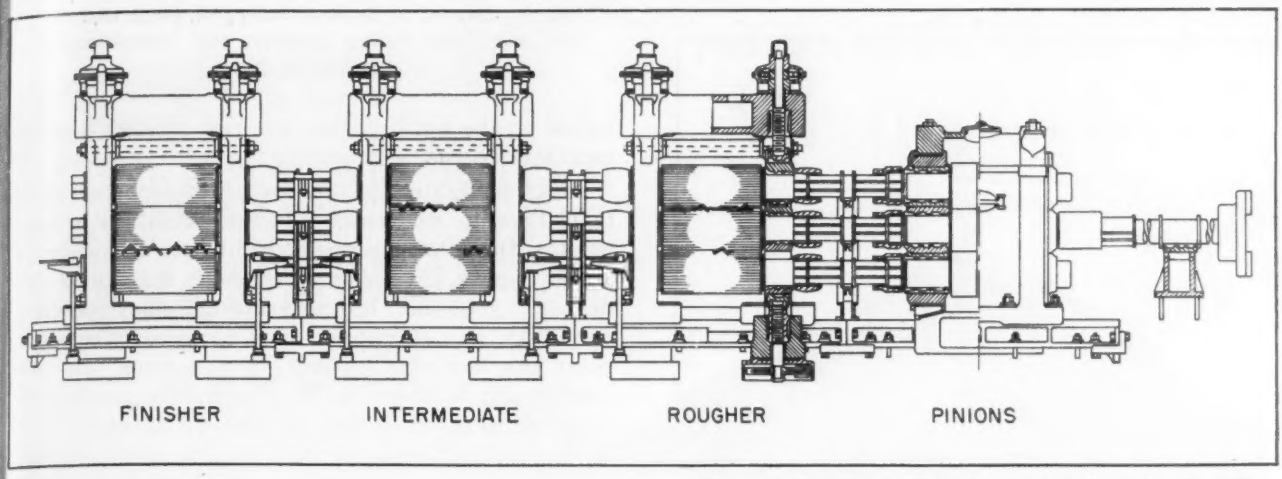


Fig. 6—Sketch of 28-inch structural and rail mill showing location of typical roll passes for the production of equal angles

Structural Shapes

opposite direction to form the section. In beam and channel rolling, proper work balance between successive closed and open flanges is important to avoid overfills, laps, or underfilled flanges resulting from choking.

It is the duty of guide tenders to keep guides properly set and aligned. Positioning of the guides in the final or finishing pass is most important since the proper delivery of the finished bar is determined at this point. Proper roll and guide settings are necessary to avoid twists, hooks, kinks, off-parallel flanges, etc.

Design of roll passes and their relation one to another is the function of the roll designer. His skill in laying out the passes and arranging them in the mill plays a large part in the efficiency and success with which a section can be rolled.

In designing roll passes for any given section a number of factors must be considered. Among these factors would be the adaptability of the general mill arrangement, roll diameters, number of passes required to accomplish the desired shaping and reduction, practical limits of bloom sizes from which the shape can be derived in required length, mill power, and method of design which refers to the manner in which the shape is developed, or the way in which the passes are cut into the roll. For example I-beams may be rolled by the straight flange method, by the diagonal method, or a combination of both. Once the proper mill for a given section has been selected and the number of passes arrived at, the individual passes must be designed. Starting with the bloom each succeeding pass must more nearly approach the cross-sectional contour of the finished bar. This must be accomplished by nearly proportional reduction of cross-sectional area from pass to pass. Since proportional elongation of all parts of a section must be attained, proportional reductions of the thick and thin members of a section must be provided to ensure uniform rolling. Reductions or drafts which may be used vary with roll size, mill arrangement, temperature, and analysis of steel. Draft or reduction increases from the finishing pass toward the roughing but the actual percentage reduction may vary. Placement of passes in particular stands is regulated by mill layout, possible operating efficiency, and roll economy. Once the passes are designed, roll drawings are prepared showing arrangement of the passes in the rolls. Rolls are usually of alloy steel and are cast to the rough shape required, by iron and steel foundries specializing in this work.

After the various passes for a section have been developed, corresponding templates are filed for use of the roll turners in machining the rolls. Roll

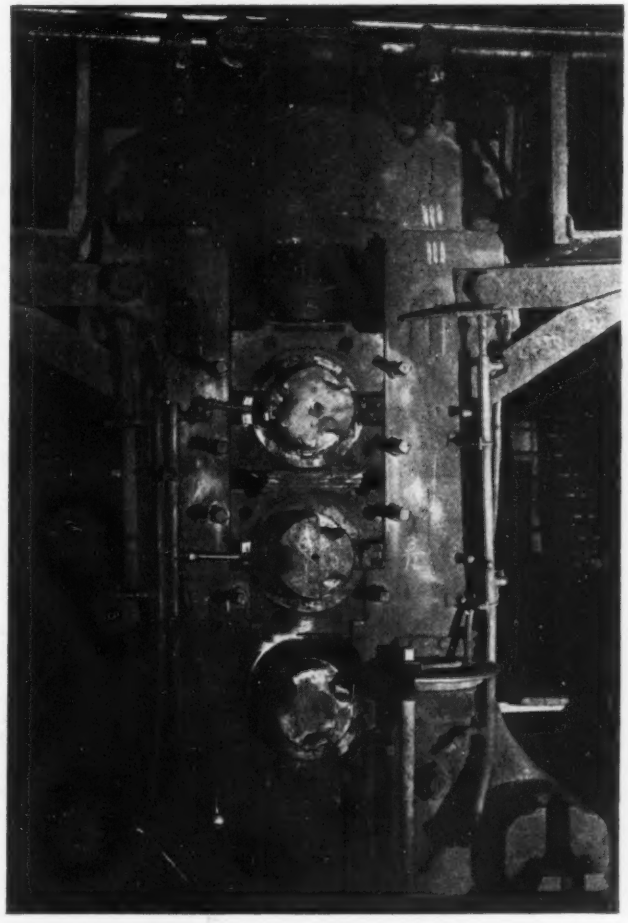


Fig. 7—Side view of 28-inch mill housing with rolls in position

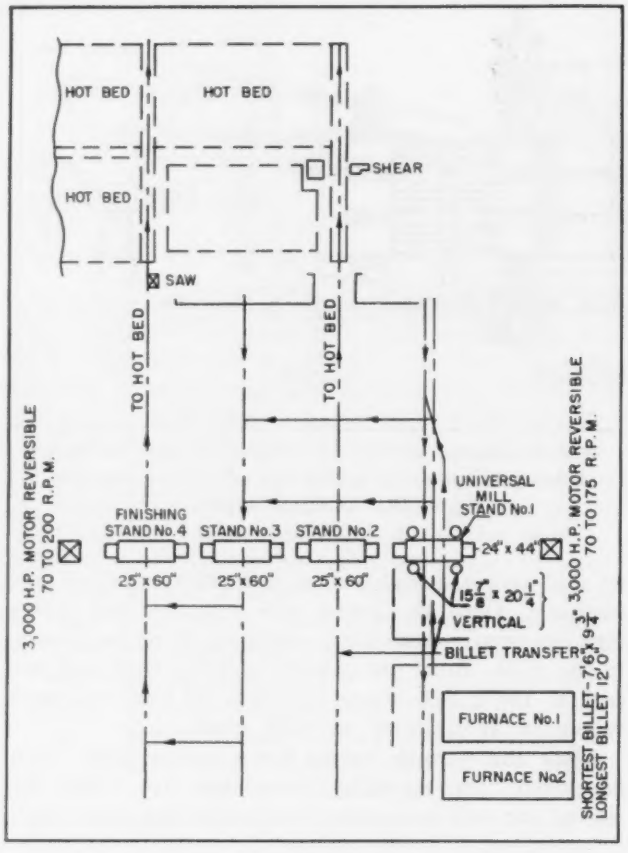


Fig. 8—Layout of 24-inch universal plate and bar mill used for rolling smaller and miscellaneous special shapes

templates are sometimes also furnished to the mill rollers to assist them in setting the passes properly in the mill.

Pass development schedules of two typical sections are shown in Fig. 10.

When the bar has left the finishing stand of the mill, it is carried along a run-out table to a hot saw where is it cut to length as ordered or in multiples of the ordered length when the latter is too short for efficient cutting at the hot saw. The bar is usually imprinted with the makers name or brand in the finishing rolls of the mill; in addition the open-hearth heat number is stamped on the bar by a stamping machine as it proceeds along the run-out table to the hot saws. After sawing the bars are pulled off laterally onto the hot beds by traveling dogs, operating between the horizontal rails. When the bars have cooled on the hot bed, they are run through a structural straightener which levels the bar.

After straightening the bar is transported along table lines to cold saws where it is cut to ordered lengths, then through gag-straighteners or bulldozers which remove any kinks or camber. With good mill delivery, good hot bed and straightening practice, very little gag straightening is required. From this point the bars are pushed off the table line into cradles and formed into lifts ready for loading for shipment to the customer. Special care must be taken in bracing and securing the load to avoid shifting and damage while in transit.

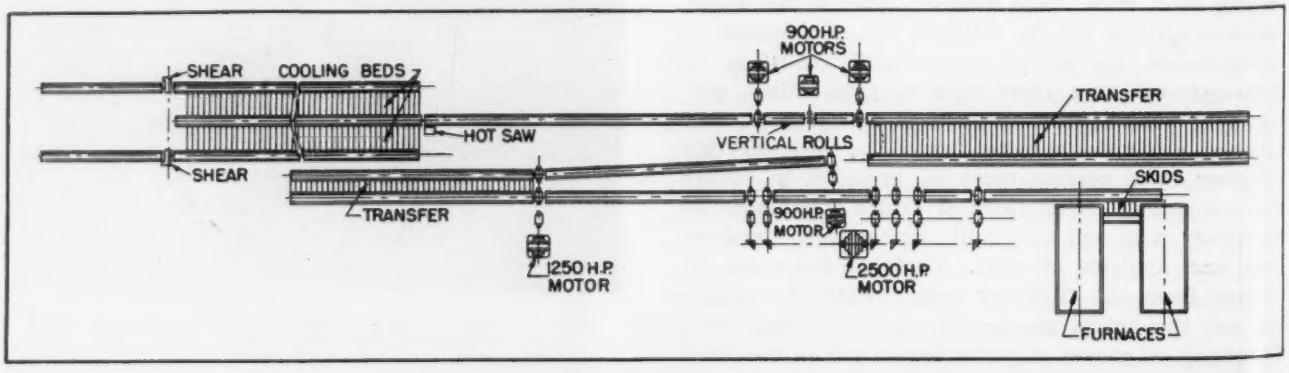
Piling bar has found increased use in recent years because of power and irrigation developments as well as flood control. This section is rolled with locks on the side of the section to permit interlocking of adjoining bars to form a tight wall. It is used in the construction of docks, dams, levees, coffer dams, canals, locks, and other applications where it is necessary to withhold or constrain the action of water or water pressure, and for purposes of forming foundations where wooden piling was formerly used. The bars are driven into the ground with pile drivers. Adjacent bars are interlocked by inserting the lock thumb of the bar into the lock opening of the adjacent driven bar. The successive joining of the bars in this fashion gives a virtually water-tight wall which may be formed to required contours.

Another relatively recent section is the Z-center sill. Two bars of this section are welded together to form the main member of the underframe of railroad cars. This section has largely displaced the former center sill section because of greater mechanical efficiency.

The types and sizes of rolled shapes have become so standardized that any given section may be secured from a number of suppliers. Standardization of sections has afforded economies both to the producer and the user. Metallurgical advancements have assured uniformity of composition and quality, permitting close control of physical properties within narrow limits as may be required.

Structural steels are usually of the so called medium-carbon range and have tensile strengths ranging between 50,000 and 72,000 psi. Recent trends have been more toward higher tensile strengths of

Fig. 9—Layout of cross country bar and structural mill used for rolling smaller structural bars



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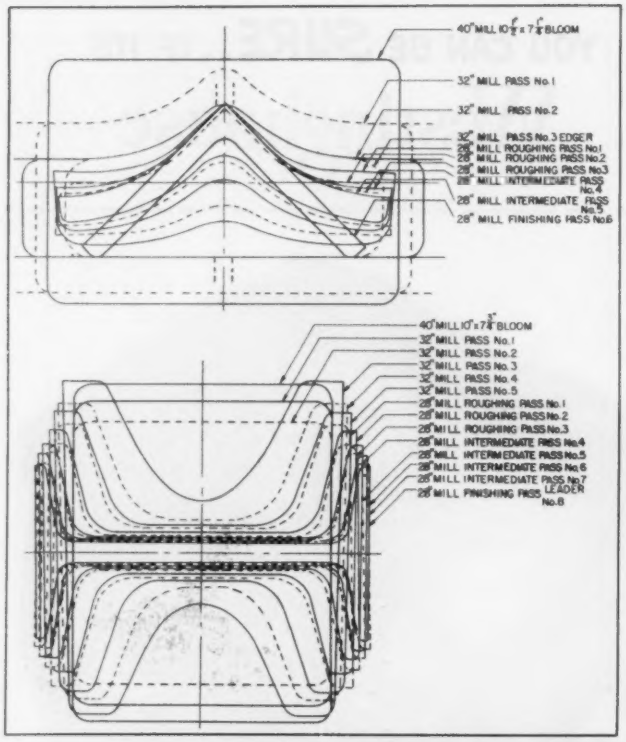
40" MILL 10" x 7" BLOOM
32" MILL PASS No.1
32" MILL PASS No.2
32" MILL PASS No.3 EDGER
28" MILL ROUGHING PASS No.1
28" MILL ROUGHING PASS No.2
28" MILL ROUGHING PASS No.3
28" MILL INTERMEDIATE PASS No.4
28" MILL INTERMEDIATE PASS No.5
28" MILL FINISHING PASS No.6
40" MILL 10" x 7" BLOOM
32" MILL PASS No.1
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32" MILL PASS No.4
32" MILL PASS No.5
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28" MILL ROUGHING PASS No.3
28" MILL INTERMEDIATE PASS No.4
28" MILL INTERMEDIATE PASS No.5
28" MILL INTERMEDIATE PASS No.6
28" MILL INTERMEDIATE PASS No.7
28" MILL FINISHING PASS LEADER No.8

Fig. 10—Pass development schedules for a 10-inch I-beam and a 6 x 6-inch equal angle

Structural Shapes

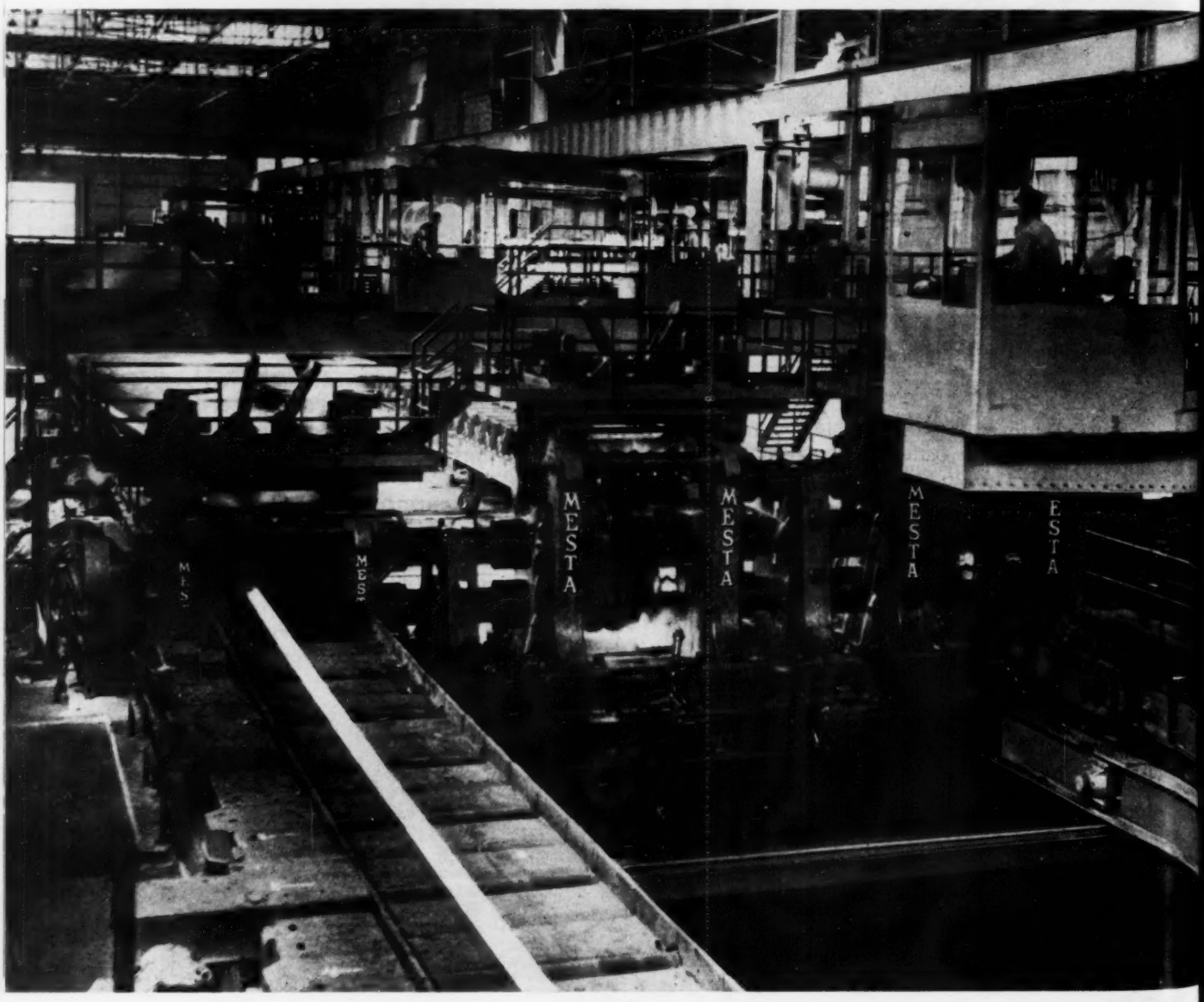
the order 60,000 to 72,000 psi. Chemical composition usually falls within the following limits: Carbon 0.15 to 0.30, manganese 0.30 to 0.60, phosphorus 0.04 maximum and sulphur 0.04 maximum.

Alloy steels are also coming into prominence through efforts to produce higher strength sections and thus reduce the weight of material required. These steels are prominent in car building, where considerable effort has been directed toward increasing the payloads—dead load ratio.

Modern construction would hardly be possible without structural steel shapes. Their properties and mechanical characteristics are well known by engineers and architects.

(To be continued)

Fig. 11—Modern high-speed structural mill showing from right to left the leader, intermediate and finishing stands also travelling tilting table at extreme right



New Books

Controllership in Modern Management, edited by Thornton F. Bradshaw and Charles C. Hull; 300 pages; sponsored by Controllership Foundation Inc., and published by Richard D. Irwin Inc., Chicago, for $4.00.

Actually a comprehensive symposium on an important phase of present day business organization, this book consists of chapters by ten contributors. Information included in the book is on on-the-job training for white collar workers, maintaining office organization morale, business budgeting, manufacturing cost accounting, selling employees on standards and controls and public relations and the annual report.

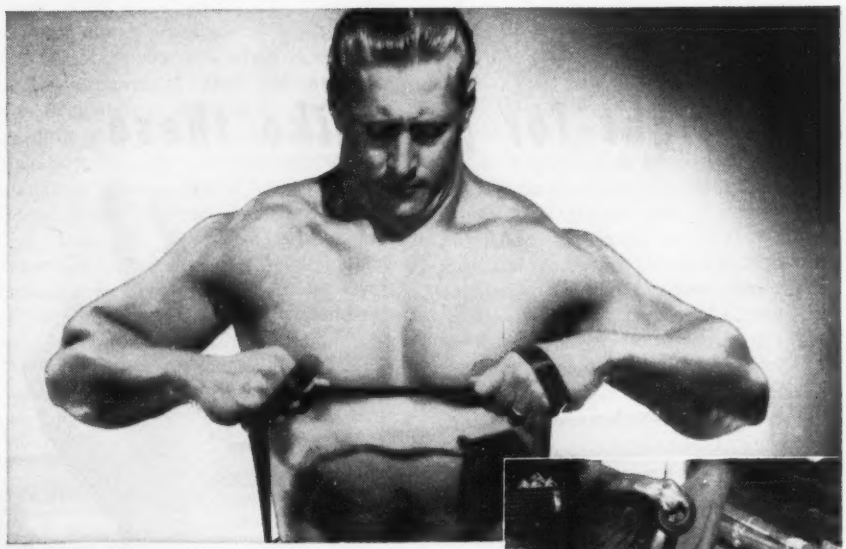
Also included are a preface by John H. MacDonald, administrative vice president of the National Broadcasting Co. Inc. and an opening chapter on top management's point of view by B. C. Heacock, chairman of the board, Caterpillar Tractor Co. A historical account of the growth of the controllership function and a summary of the work and development of the Controllers Institute of America will be found in the book.

—o—

Welding Metallurgy — Iron and Steel, by O. H. Henry, professor of metallurgical engineering, Polytechnic Institute of Brooklyn, and G. E. Claussen, metallurgist, Reid-Avery Co., revised by G. E. Linnert, senior research engineer, Armco Steel Corp.; cloth, 505 pages, 5½ x 7¾ inches; published by American Welding Society, for $2.50.

Such processes as inert-gas metal-arc welding, introduced since this book was first published in 1940, and more information on the metallurgy of stainless, heat resisting and stainless-clad steels among other materials, are contained in this revised edition. The addition of 150 pages and an increase of illustrations to 203 have served to increase the value of this book. Also added is a short bibliography, an extensive index and questions on each chapter at the end of the book.

Fundamentals of metallurgy are discussed in the first chapters for those having no previous knowledge of the subject. The welding metallurgy of specific materials and the effect of different elements is discussed in later chapters so the book can be useful for both technical and nontechnical readers. In this second edition, the theme remains unchanged. As before, steels or ferrous alloys are the center of most discussions. Although relatively few



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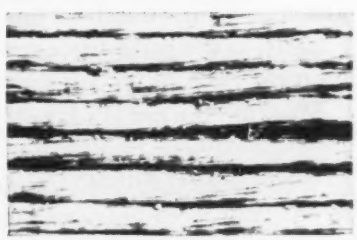

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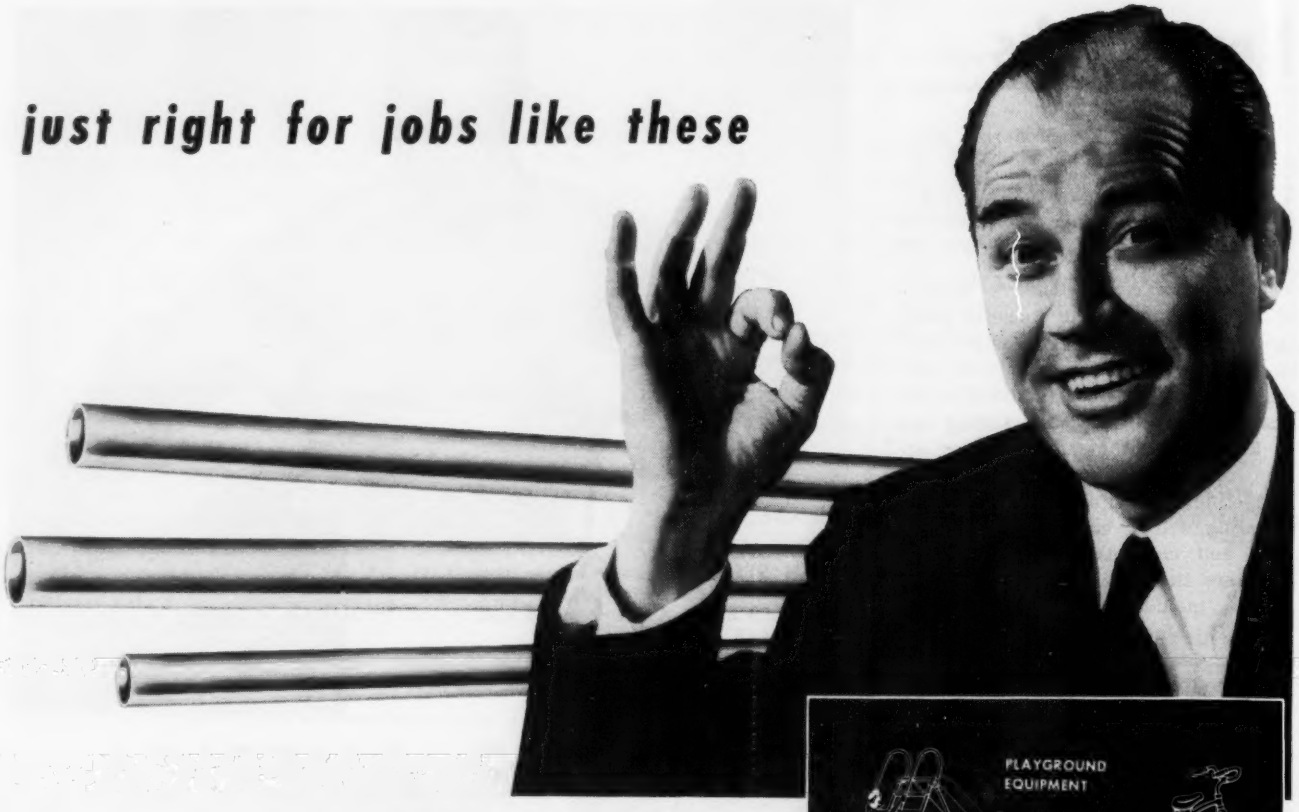
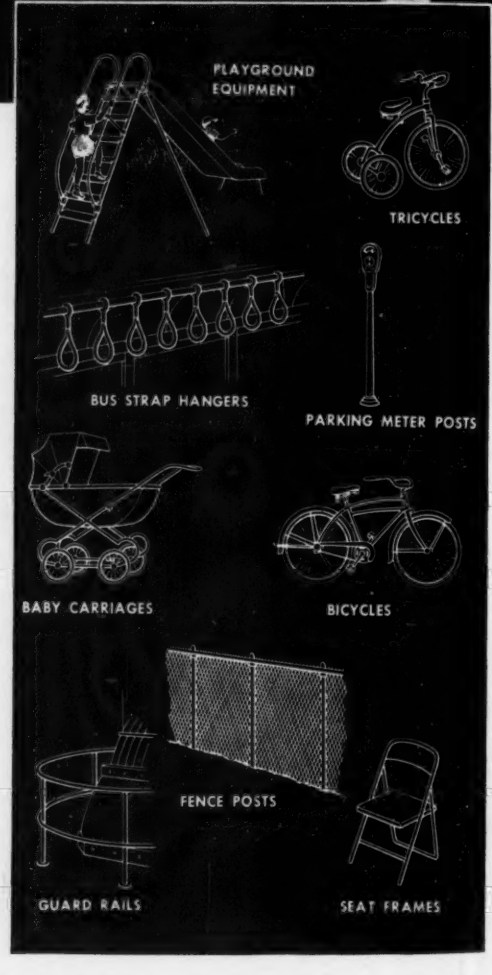


NATIONAL *Electric Welded* MECHANICAL STEEL TUBING



IF you're looking for good, economical commercial quality mechanical tubing, NATIONAL *Electric Welded* Tubing is just what you need. Made from low carbon steel strip by electrical resistance welding, it is ideal for many mechanical uses such as playground equipment, bicycles, baby carriages, automobile structural members, furniture and seat frames, and strap hangers, as well as for fence posts, guard rails, stanchions, parking meter posts, etc.

Made by the world's largest manufacturer of steel tubular goods, NATIONAL Electric Welded Mechanical Steel Tubing is available in sizes 4 inches OD and under.

For further information about NATIONAL Electric Welded Tubing and other mechanical tubular products offered by "Tubing Headquarters," write National Tube Company, Frick Building, Pittsburgh 19, Pennsylvania.

NATIONAL TUBE COMPANY, PITTSBURGH, PA.
(TUBING SPECIALTIES DIVISION)
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

NATIONAL *Electric Welded* MECHANICAL STEEL TUBING

UNITED STATES STEEL

references are made to other commonly used metals, much of the information is very general in character and can be applied to many metals.

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Oxyacetylene Welding and Cutting, by Stuart Plumley, revised by T. B. Jefferson, editor, *The Welding Engineer;* cloth, 355 pages, 8½ x 11¼ inches; published by McGraw-Hill Book Co. Inc., New York, for $6.50.

Intended to be an easy-to-understand course of instruction in oxyacetylene welding and cutting techniques, the book begins with basic principles and proceeds, step by step, to show how to develop skill in handling both repair and production work. Various types of welding and cutting work, such as pipeline welding, flame-cutting steel and cast iron, brazing, lead welding, welding of light metals, bronze welding and brazing, hard-facing, boiler and firebox welding, etc., are covered.

In this fourth edition stress has been placed on pipe welding and the newer techniques in the welding of alloy steels, aluminum and magnesium and silver brazing. Also included are chapters on job shop operation and management and the business side of welding, written to assist the welding shop owner in systematizing his shop. To aid the student in self teaching, most of the chapters are closed with exercises and questions.

A number of photographs and drawings illustrate the book. Also included are many tables, a glossary of welding terms, and appendixes with a variety of information.

—o—

The Great Illusion—An Inexhaustible Public Purse, by Thomas S. Holden, president, F. W. Dodge Corp., and chairman, Federal Grants-in-Aid Subcommittee of NAM Government Spending Committee; paper, 32 pages, 8½ x 11 inches; published by National Association of Manufacturers, New York.

This study is concerned primarily with only one aspect of the problem of government spending—federal grants-in-aid. According to the book's foreword, these grants are not yet, in total, as large as some other major items in the federal budget. However, their postwar growth and their political implications make them worthy of the most serious attention by public officials and public-minded citizens, it states.

The report is a supplement to the NAM's first report on federal grants-in-aid, *Can Uncle Sam Do It Better,* published in January, 1948. Source material for *The Great Illusion* was derived principally from the report of the Joint Congressional Committee on Reduction of Nonessential Federal Expenditures, annual reports of the Secretary of the Treasury, reports of the Bureau of the Budget and the Department of Commerce, and pubications of the National Industrial Conference Board and of the Council of State Chambers of Commerce.

Among the subjects covered are concentration of fiscal and administrative power, should Uncle Sam help the poorer states, cost of aid programs and federal versus state and local taxes. A number of charts and tables supplement the report.

Deoxidation, Refining Processes Found To Affect

CREEP-TO-RUPTURE TESTS

DEOXIDATION practice employed in the manufacture of low carbon steel accounts for the rather wide range in results of creep and creep-to-rupture tests detailed in a paper presented at the annual meeting of the American Society for Testing Materials in Atlantic City recently, by G. V. Smith and E. J. Dulis, Research Laboratory, United States Steel Corp. of Delaware, Kearney, N. J. The tests, carried out at 850° F for periods up to 3500 hours, were on 12 heats of normalized low carbon steel, representing various refining and deoxidation practices.

Estimated stress for rupture in 10,000 hours ranged from 12,000 to 22,000 psi and the observed stress to produce a minimum creep rate, the so-called second stage of the elongaton-time curve, of 0.1 per cent per hour ranged from 19,000 to 32,000 psi, both of these tests being dependent upon the refining and deoxidation processes. It was brought out that the weakest of the open-hearth steels tested was that deoxidized with the greatest amount of aluminum, and the strongest, that deoxidizd with silicon but no aluminum. Capped steel, of intermediate strength, was excluded and the possible effect of differences in chemical composition and in structure were ignored.

Bessemer steels, other than the capped heat, were similar to one another in the degree of deoxidation and showed uniform results; the speakers asserted, however, that the roll of deoxidation in bessemer steels is as important as in open hearth steel. The agreement in the results of the similarly-deoxidized bessemer steels indicates that the range of creep properties in carbon steel can be controlled within narrow limits if warranted, provided attention is given to known variables. The influence of type of refining process, is indicated to be minor, relative to the effect of deoxidation practice, although the range of materials investigated was not extensive enough to permit comparison of open-hearth and bessemer steels over the whole range of deoxidation practice.

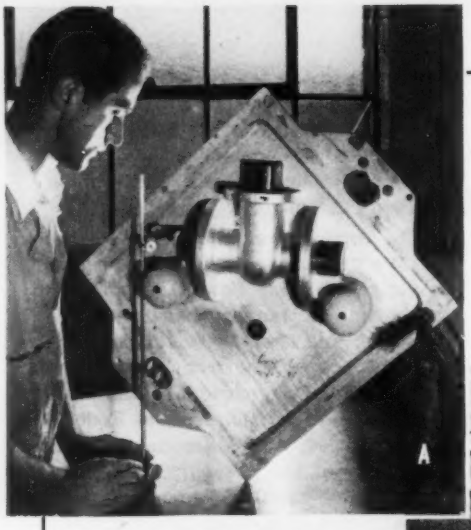
Relations between stress and time for rupture, and between stress and minimum creep rate proved, in confirmation of the results of other investigators, to be relatively simple, being linear on double logarithmic co-ordinates. It was observed that minimum creep rate data obtained for five of the steels at rates on the order of 0.0001 per cent per hour at stresses too slight to produce rupture within an arbitrary 3000 hour test period, aligned with the faster rate data of the creep-to-rupture tests.

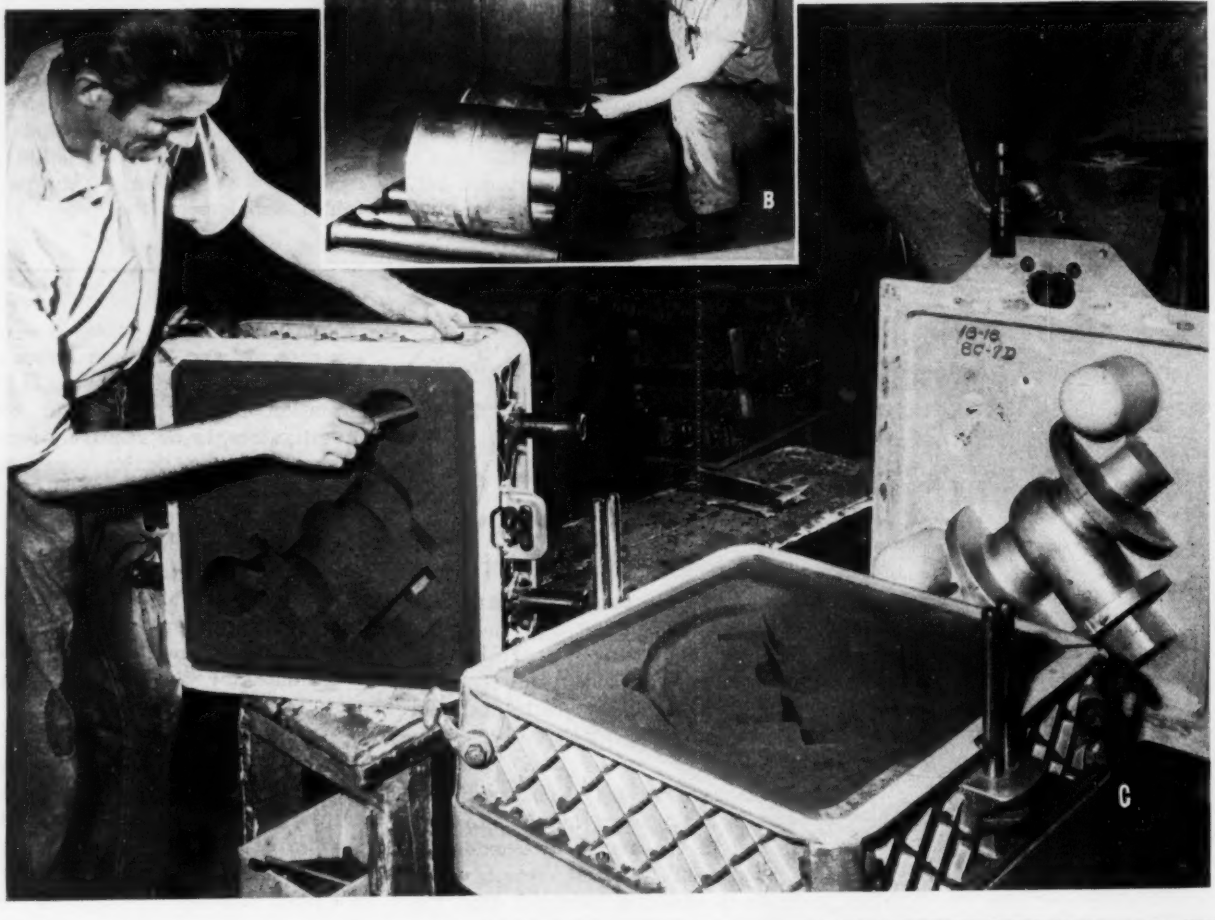
The elongation and reduction of area remained substantially constant, and the type of fracture remained transcrystalline throughout within the test time studied, the speakers stated. All specimens "necked in" and showed severely elongated grains at the fracture. Some slight spheroidization, but no graphitization, was encountered, particularly in the longer time test. Notch-impact and hardness tests on specimens prepared from creep tests discontinued prior to rupture indicated that no important deterioration in ordinary mechanical properties occurred.

Relation between stress and the end of the period of minimum or uniform creep rate was indicated to be nearly identical in character with that between stress and rupture-time, the curve for the former lying, for the steels tested, some 1000 psi below the latter at any specified time.

STAINLESS FOUNDRY

Planned use of controls and tests during all processing stages is helping Cooper Alloy Foundry Co., Hillside, N. J., to produce large quantities of high quality stainless steel castings with excellent results in uniformity. The rigid system developed by Cooper works efficiently in the manufacture of valve bodies, fittings and miscellaneous castings. These parts are poured from a battery of carbon arc and electric furnaces whose melt capacity exceeds 1 million pounds per month. Translated into the company's variety of cast stainless products, which weigh from 1 ounce to 2 tons, this represents almost 5000 individual pieces per day. Accompanying views show some of the typical procedures followed in the plant: (A) Patternmaking, (B) x-raying centrifugal castings; (C) molding





Wrapping Prevents Rust

A CHEMICAL vapor which forms an invisible protective film around ferrous articles to prevent corrosion is being produced by Angier Corp., Framingham, Mass., under license of Shell Development Co. The rust preventive packaging method consists of a chemical vapor phase inhibitor applied to the wrapping in which the ferrous article is placed.

Wrapper need not be in direct contact with the surface to be protected in order to prevent corrosion. Further rusting when some rust is already present is said to be prevented as is the spreading of corrosion. It is reported that tight sealing of the package is not necessary and that puncture-proof wrappings are not required. The article can be removed, examined and replaced without destroying any feature of the protective package.

The VPI wrap, as it is known, is primarily for protective packaging of articles which are made of bare steel or aluminum. Besides protecting such finished items as aircraft and automobile parts, hand saws, ball bearings, gears, etc., the protective coating may also be used for the protection of steel stock in temporary parts storage, protection of steel between processing steps and protection of stored machine or hand tools. It is reported that the VPI wrapping is harmless to handle in packaging.

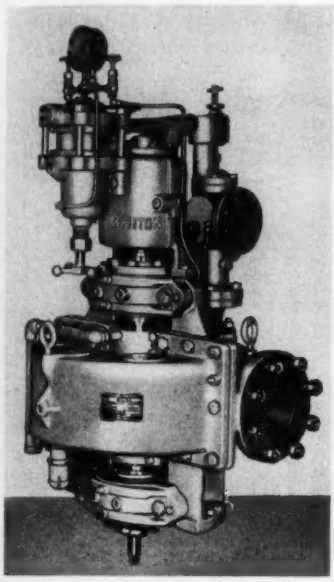
—o—

Printed copies of simplified practice recommendation R207-49 concerning pipes, ducts and fittings for warm air heating and air conditioning are available from Commodity Standards Division of National Bureau of Standards, Washington 25, D. C., for 10 cents each.

New Products and Equipment

Vertical Turbine

A compact vertical steam turbine capable of developing horsepower ratings up to 90 bhp is available from Whiton Machine Co., New London, Conn., for driving centrifugal pumps and other vertical units. It is



available in either semisteel or cast steel to meet requirements of practically any steam pressures and temperatures.

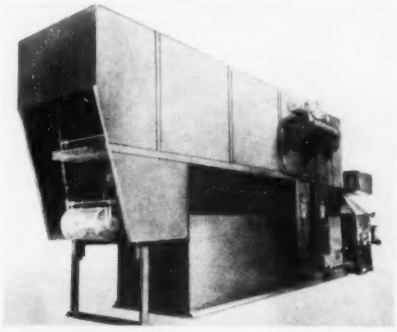
Standard turbine can take thrust loads in either direction up to approximately 1500 pounds and can easily be changed to take even higher thrust loads. Turbine is equipped with both constant speed and emergency governors. Pump governors can be built into the machine. Equipment also includes a bolting flange at the lower part of the casing to permit bolting to the flange of the driven unit.

Check No. 1 on Reply Card for more Details

Tumbling Conveyor

Fully automatic and loading and unloading at the same time plus ability to carry either flat trays or tumbling baskets alternately are features of the tumbling conveyor announced by Phillips Mfg. Co., 3475 W. Touhy Ave., Chicago 45, Ill. Tumbling baskets are for small parts that would cup solvent. Machine comes equipped with an automatic still and is so wired that dirty solvent is continually being pumped into the still and reclaimed solvent returned to the machine.

Conveyor system consists of two strands of roller chain connected at 2-foot intervals by cross rods. It is electrically heated by immersion type heating elements. Still is heated by strip heaters and has a distillation rate of 60 to 75 gallons per hour. Both still and machine have low limit controls which shut off the

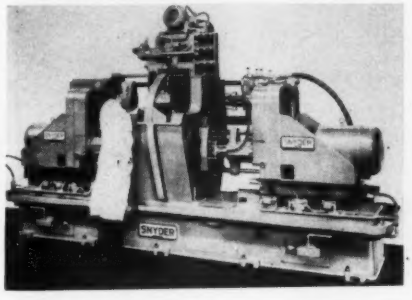


heat and manual reset safety controls in boiling chambers to shut off heaters if boiling temperature of solvent rises to the danger point due to excessive contamination or low solvent level.

Check No. 2 on Reply Card for more Details

Automatic Cycle Machine

Drilling, countersinking, rough boring and semifinish reaming operations are performed on automatic transmission parts by an automatic cycle machine built by Snyder Tool & Engineering Co., Detroit, Mich. The work piece is located and clamped in special, air-operated, diaphragm chucks. A hydraulically operated pressure plate at the drilling



station supports the part and chuck against drill pressure. Machine is equipped with a four station, Geneva operated trunnion. On the right side of the trunnion is an 18 spindle multiple drill head with one master head carrying three 6-spindle pot heads, each of which has its own bushing plate.

On the left the trunnion is a 6-spindle head, also with a master head but with a single 6-spindle pot head. Work cycle is carried on at four stations and is entirely automatic. Tools are high speed steel running at 70 surface feet per minute and stroke is 0.008-inch per revolution. Hydraulic and coolant systems are housed in separate tanks at the rear of the machine.

Check No. 3 on Reply Card for more Details

Shaper

Six automatic feeds in either direction, from 0.002 to 0.012-inch, are set by a dial feed with readings graduated to 0.001-inch on the new 8-inch shaper, introduced by Logan Engineering Co., 4901 W. Lawrence Ave., Chicago 30, Ill. A maximum stroke of 8½ inches permits machining of work 8 inches long. Straight, angular, and squaring cuts, machining and slotting may be handled.

A half turn of the feed handle in either direction reverses the feed.

Speed from 35 to 180 strokes per minute is obtainable; speed changes are effected by turning a convenient hand wheel control. The 8 x 8-inch table has a vertical travel of 5½ inches and a 10½-inch traverse. Because the tool head may swivel 360 degrees, squaring the ends of stock of almost any length is possible.

Check No. 4 on Reply Card for more Details

Transfer Bin

Metal Equipment Co., Cleveland, O., is manufacturing a transfer and storage bin, base and containing compartment which are welded into one unit. It may be used for the moving of bolts, nuts and parts from one operator to another for machining, inspection, assembly and storage.

Open elevated front permits quick

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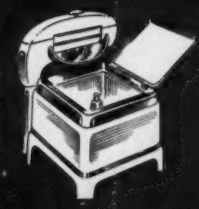

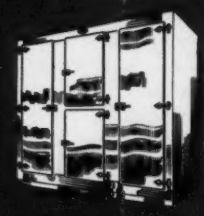

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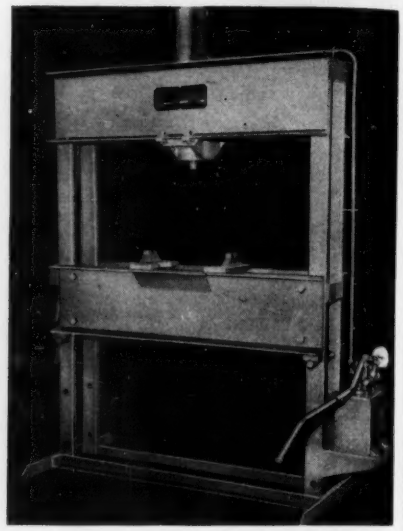
unloading and identification of parts when stacked for storage. Angle iron top assures secure stacking. Front of base is round cornered to allow tumbling of bin near bench or machine operator.

Check No. 5 on Reply Card for more Details

Shop Presses

Rodgers Hydraulic Inc., Minneapolis, Minn., is producing shop presses in 60 and 80-ton capacities, designed for light-duty press requirements. Features include a 13-inch pressure stroke, accurately matched and machined V-blocks, lower bolsters supported by bearing blocks on steel support pins, fast arbor press action and operation by either hand or power pumps.



An improved 2-speed hydraulic hand pump with automatic shift permits fast ram speed of 1⅛-inch per stroke with 2 ton high speed pressure on the 60-ton model and ¾-inch travel with 5 tons pressure on the 80 ton model. When the maximum 2 or 3 ton pressure has been reached, the pump shifts automatically into high pressure.

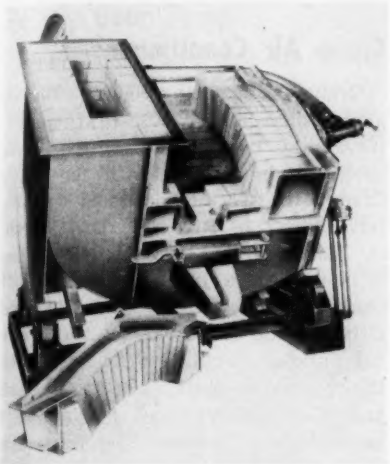
Check No. 6 on Reply Card for more Details

Tilting Furnaces

Ability to produce from 13 to 21 melts per day of ferrous or nonferrous metals, is the line of reverberatory tilting furnaces of the Sklenar type, announced by Bellevue Industrial Furnace Co., 2971 Bellevue Ave., Detroit, Mich. Built in capacities of 350 to 20,000 pounds, the units are self-contained, being fired with oil or gas and having a draft supplied by an integral blower. Metal is charged through a hopper which is also the exhaust from the combustion chamber.

Metal is preheated and melted in

suspension in the hopper and then trickles down into the metal bed. In this manner no cold metal ever reaches the molten bath, and it is not necessary to shut off the flame to charge additional metal. Combustion chamber is heated by the same fuel as is used to melt the metal in the hopper. Atmospheric conditions



in the combustion chamber are kept under close control to eliminate occluded gases. Furnaces are readily accessible for skimming, refining, alloying and inspection during the entire melt. Type of tilting mechanism is governed by the size of the furnace.

Check No. 7 on Reply Card for more Details

Dumping Hand Truck

Nontilting fork model Worksaver battery powered hand truck, made by Yale & Towne Mfg. Co., Philadelphia, Pa., is equipped with a re-

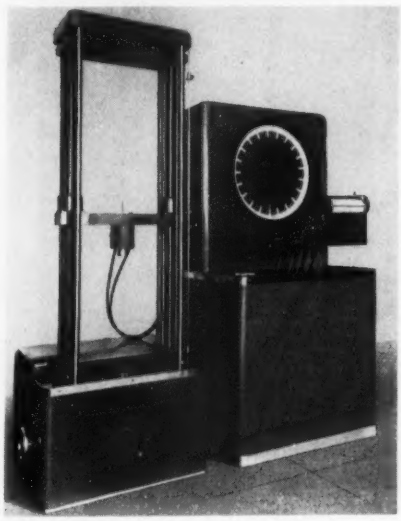
volving fork carriage to accomplish such tasks as emptying scrap bins, dumping small parts from one bin to another, pouring ingredients into mixing or batching equipment, etc.

Bins used in conjunction with the Worksaver adaptation have short angle iron lugs welded to their sides to form a slot into which the truck forks fit. The slots permit the truck to lift the bin to the desired dumping height, suspend it while the revolving carriage rotates to dump the load. The 360 degree rotating mechanism is operated by a lever in front of the mast of the truck, while it is available in 1000 and 1500 pound capacities.

Check No. 8 on Reply Card for more Details

Testing Machine

Hydraulic and pneumatic load cells, both operating a Tote-Emery indicator, are used as load-sensitive elements in the weighing system of the model PTE universal testing machine, developed by Baldwin Locomotive Works, Philadelphia 42, Pa. Four standard load ranges of 5000, 1000, 200 and 50 pounds are pro-



vided by the hydraulic cell. Two additional ranges of 10 and 2 pounds are provided when specified, by means of an air cell.

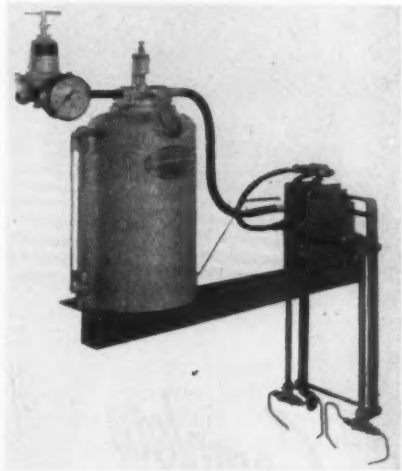
Machines are suitable for testing fine wire, light metal foils, light structures of metal, and various other materials. Tension may be 3⅜ to 51 7/16 inches and compression space from 0 to 48 inches. Clearance between vertical screws is 18¼ inches. Indicator is contained in a separate cabinet, giving flexibility in the relative positioning of the two units. A recorder may be used with the machine and will plot stress-strain curves with 10-inch ordinate for one-half and full capacity of any range.

Check No. 9 on Reply Card for more Details

Trolley Wheel Lubricator

Automatic lubrication of trolley wheel bearings and pins on a twin T-rail type of Link-Belt conveyor, operating through a core oven, is performed by a lubricator offered by J. N. Fauver Co., 49 W. Hancock, Detroit 1, Mich. It lubricates both bearings at the hubs on inside and outside of the wheels. Operation is entirely automatic.

As each pair of trolley wheels passes the lubricator, the wheels trip triggers which automatically release jets of oil - fogged air directly into the wheel bearings. Air from the



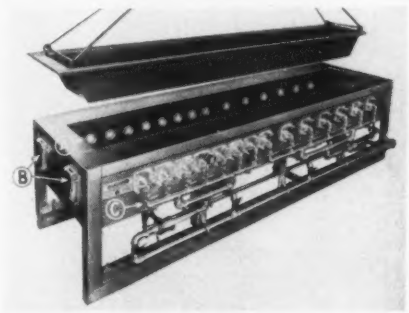
plant line is stepped down to proper operating pressure by a Norgren regulator. Air pressure, volume of atomized lubricant, direction and timing of "shot" are easily adjusted.

Check No. 10 on Reply Card for more Details

Pot Furnace

Radiant ceramic gas burners in furnaces developed and made by Selas Corp. of America, Erie Ave. and D St., Philadelphia 34, Pa., are used to heat pots for the continuous tinning of multiple strands of wire. Wire gages from 4 to 20 may be tinned at production rates of 150 to 500 fpm.

The pot furnace, applicable to hot coating processes such as rosin, lead,



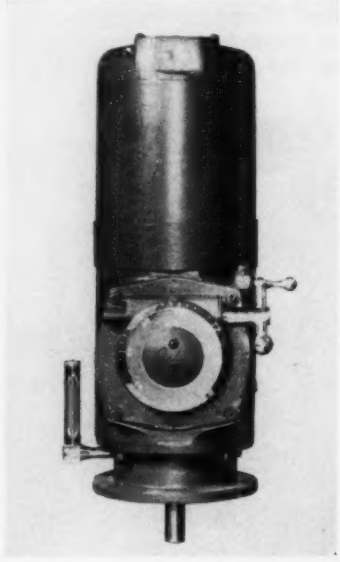
zinc, and plastics, has radiant burners spaced to apply the greatest concentration of heat at the end where the wire enters the pot. Air-gas mixing systems regulate fuel supply for most complete and effective combustion. Increased pot life is obtained by applying heat from the radiant burners in patterns along the sides of the pot. The pot itself is made of whatever steel is required

for a specific installation. Radiant ceramic gas burners (A), access doors (B), and gas burner manifold (C), may be seen in the photograph.

Check No. 11 on Reply Card for more Details

Variable Speed Drives

All speeds from 0 to 1100 rpm are possible with the type F variable speed transmission, developed by Graham Transmissions Inc., 3754 N. Holton St., Milwaukee 12, Wis. Built in sizes from ¼ to 1 hp, it is designed for vertical flange mounting, having standard NEMA flange mounting dimensions. It can be furnished with special shaft extension where required.



Features include spaced bearings on the output shaft with two tandem mounted oil seals to insure against oil leakage. Micrometer control makes possible accurate speed settings. Transmission closely maintains set speed even with change in load. The drive is available without motor or with built-in, open or TENV, three phase or capacitor start-induction run, 1800 or 3600 rpm motor.

Check No. 12 on Reply Card for more Details

Bucket Equipped Tractor

Equipped with a 10 cu ft standard bulk materials bucket is the model TL-B Tracto-Loader, announced by Tractomotive Corp., Deerfield, Ill. Having the bucket over the driving wheels and the steering wheels in the rear results in good traction and easier steering. Unit is mounted on rubber tires and has a hydraulically controlled bucket that can be dumped in whole or in part to a height of approximately 5 feet.

Overall length with bucket down is 9 feet 5 inches. Major tractor components are from Allis-Chalmers tractors. Brake horsepower is 27.8. Designed to handle bulk materials in congested areas, the tractor will go into standard 6-foot wide box car doors. It will handle 20 to 25 tons of most bulk materials per hour on a 300-foot round trip haul.

Check No. 13 on Reply Card for more Details

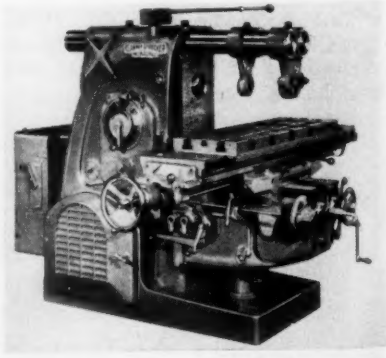
Crane Air Conditioner

Crane cabs exposed to fumes, gases, dirt, and excessive temperatures may be supplied with filtered, cooled or heated air with the Little Giant Aire-Rectifier designed by Lintern Corp., 29 Riverside Dr., Berea, O. Measuring 17 x 38 x 48 inches it is offered in two models: A self-contained unit which can be located either inside or outside of the crane cab; and a so-called split unit with the condenser unit outside the cab and a relatively small cooling unit located inside the cab. Use may also be in small pulpits and operating stands.

Check No. 14 on Reply Card for more Details

Milling Machine

Featuring a build-in chucking table to simplify workholding problems, a new line of knee type milling machines, built by Kearney & Trecker Corp., Milwaukee, Wis., is intended to facilitate the handling of irregularly shaped workpieces. Design of the table is such that with certain simplified vise jaws and standard setup accessories, a chucking mechanism is provided to handle various shaped workpieces with a minimum of time for setup. Twenty-four chucking table milling machines are available in plain or vertical styles, with or without automatic cycle monolever table control, in two sizes, having 42 and 50-inch power table travel, respectively.



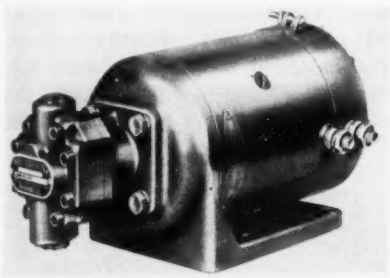
Power capacities range from 20 to 50 hp. Deep well coolant drain provides a fast clean coolant return. Longitudinal T-slots are precision

milled for positive alignment of jaw bases and jacks. Five transverse T-slots are spaced for maximum work-holding capacity within the table range. Smooth universal reversible jaws, serrated universal reversible jaws and vice jaw blanks are offered.

Check No. 15 on Reply Card for more Details

Rotary Gear Pump

Pump and motor unit are exactly mated to each other for maximum efficiency of both units in the Constant-Flo rotary gear pump developed by John S. Barnes Corp., 174 Walnut St., Rockford, Ill. Unit combines the specific model of the pump



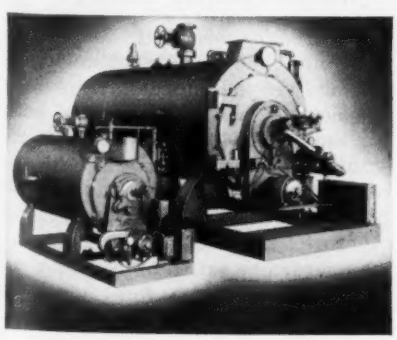
best suited to the requirements with a special 12-v series wound motor of sturdy design.

For use with battery power in industrial equipment, the pump delivers 2.5 gallons per minute at 650 psi or 2.0 gallons per minute at 1000 psi. Maximum pressure is 1500 psi. Models are available in ¼-inch ports with built-in relief valve and special ports and special mounting brackets to suit a particular application.

Check No. 16 on Reply Card for more Details

Steam Generators

High atomizing burner nozzle incorporating a primary air supply assures precise injection of fuel and air for efficient combustion at all



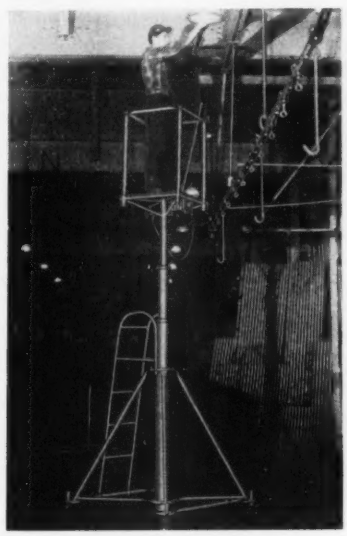
firing rates in the new steam generators announced by Cyclotherm Corp., 90 Broad St., New York 4, N. Y. Design permits interchangeable oil or gas firing without requiring a nozzle change.

Models also include a simplified air supply system, improved combustion and ignition programming controls and a blower-air channel design that achieves quiet operation. Generators are available in sizes ranging from 10 to 300 hp and in pressures from 15 to 200 pounds.

Check No. 17 on Reply Card for more Details

Maintenance Tower

Maintenance work may be performed at any platform level from 7 to 17 feet above the floor with the one-man operated Hydro-Lift maintenance tower, offered by Safway



Steel Products Inc., Milwaukee 13, Wis. It may be raised or lowered rapidly and with little effort after being rolled to location on large swiveling casters with rubber tires.

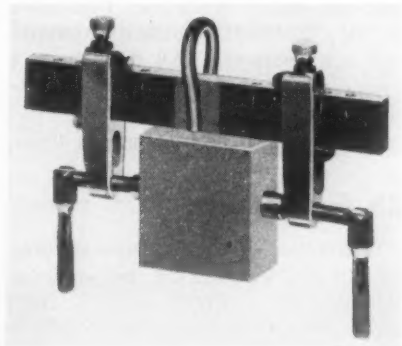
An integral tubular steel ladder with hand rails provides easy access to the work platform when in its retracted position. Platform is raised on a telescoping ram by means of hydraulic power. Through manual reciprocation of a long lever on the platform which operates a hydraulic pump. A removable guard rail protects the worker while on the platform.

Check No. 18 on Reply Card for more Details

Nonslipping Lifter

Bulky and awkward materials and equipment may be lifted by a multi-purpose, Gonser Grizzly lifter, made by Pucel Enterprises Inc., 3746 Kelley Ave., Cleveland 14, O. The lifter and its interchangeable attachments are constructed of hardened tool steel. Lifter bar is calibrated in inches and is available in various lengths. Easily readable calibrations assure accurate, balanced lifting or lowering.

The nonslipping lifter bar deflects apportionately when any material is lifted, creating a strong clamping or gripping action of the jaws. Swivel joint locking handles require no tools for tightening. Jaws are reversible

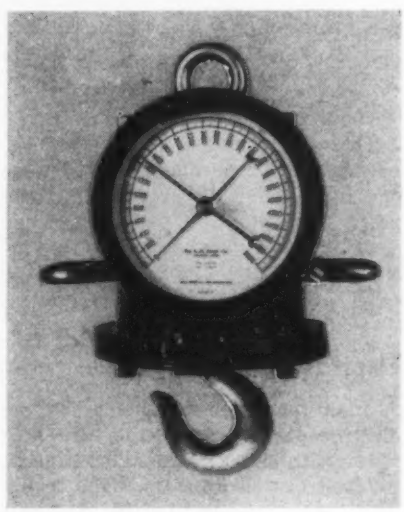


to permit either inside or outside clamping and are also usable as a jack, jig, or fixture. Gripper cups, metal disks with hard rubber facing, are fitted to jaws for added protection against marking of highly polished surfaces.

Check No. 19 on Reply Card for more Details

Hydraulic Crane Scale

Designed for measurement of loads as they are handled by a crane and adapted for other force or load measuring applications is the line of hydraulic crane scales produced by A. H. Emery Co., Stamford, Conn. Three models of the crane scale are available: Model EU-20-T for any one of 8 load capacities from 0 to 1000



pounds to 0 to 10,000 pounds; model EU-40-T for 0 to 12,000 pounds, 0 to 15,000 pounds and 0 to 20,000 pounds; and model EU-60-T for 0 to 25,000 pounds and 0 to 30,000 pounds.

Basic feature is the type EU hydraulic cell which converts force into

corresponding fluid pressure and which is connected to a pressure indicator, calibrated to read in pounds of load on the scale. Complete unit measures from approximately 22 to 36 inches in overall height, depending upon the model. Hook and eyebolt are swivel mounted. Dial sizes of 8½, 12 and 16 inches in diameter are available. All dials have a simple adjuster for setting the pointer to zero.

Check No. 20 on Reply Card for more Details

Air Gage Spindle

Difficulties of cocking and sticking encountered in checking shallow large diameter holes which offer a minimum of bearing when the spindle is presented are eliminated with a spider type gage spindle developed by Shef-

field Corp., Dayton 1, O. It is used with the Precisionaire, a flow type air gage, for checking internal diameters, bell mouth, out-of-round and the average diameters.

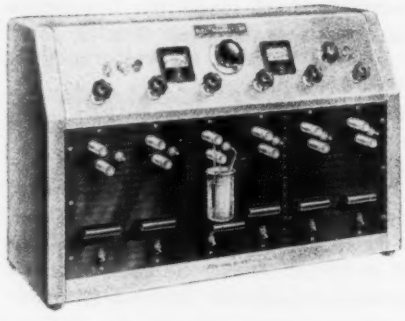
The new spindle enters shallow holes easily, regardless of the manner in which it is presented to the part. It is light in weight and has a flexible hose connection to the instrument.

Check No. 21 on Reply Card for more Details

Electro Analyzer

Quantitative measurements of the electrodeposition of metals are provided with the Electroanalyzer made by Central Scientific Co., 1700 Irving Park Rd., Chicago 13, Ill. Six sets of fixed anode-cathode positions permit simultaneous determination. Air or gas agitation is controlled at each station and a selector switch permits reading the voltage at any station.

A maximum of 5 amp direct current can be applied to any or all of the stations. Current flowing through the circuit is controlled by a knob on the front panel. A voltmeter reading 0 to 8 and an ammeter read-

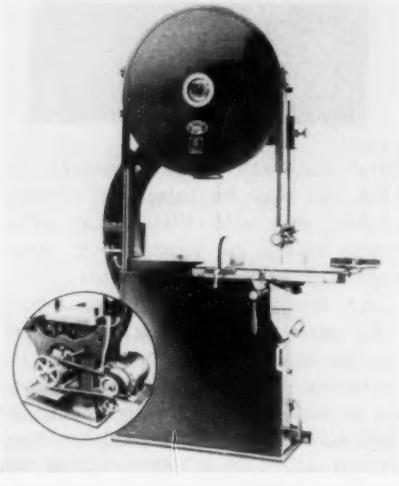


ing 0 to 5 are on the front panel. Polystyrene electrode holders operate with finger pressure to support electrodes.

Check No. 22 on Reply Card for more Details

Band Saw

A choice of operating speeds from 150 to 1200 rpm is provided with the heavy-duty 4-speed transmission incorporated in the high speed band saw made by Moak Machine & Tool Co., Port Huron, Mich. Prelubricated and factory sealed bearings on the



wheels and motor eliminate the need for periodic inspection and the danger of over or under-lubrication. Two-wheel equalized brakes stop the wheels smoothly in a few seconds when the brake pedal is depressed, or automatically if a blade breaks.

Check No. 23 on Reply Card for more Details

Diesel Electric Plant

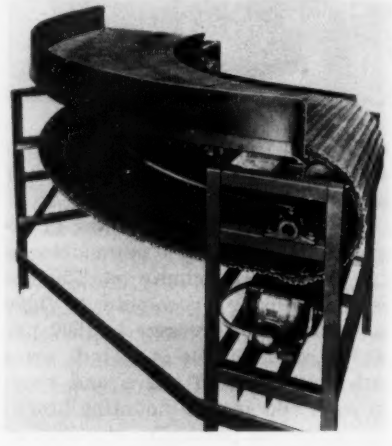
Smooth operation and compact design are combined in the model 5DRP, 5000-ac diesel-electric plant offered by D. W. Onan & Sons Inc., Minneapolis, Minn. Powered by an Onan-designed, opposed-two-cylinder, air-cooled diesel engine, the unit requires no bolting down and no special base. Integral shock mountings make possible operation on the floor. Weight of plant is 725 pounds, less batteries.

Adaptable to portable applications, it is available in 50 and 60 cycle and in all standard voltages. Longer engine life is obtained by the extra-large bearing surfaces and forced pressure lubrication. Two intake air manifolds have built-in electric heaters. Electric cranking from a start stop switch control located on the plant is provided.

Check No. 24 on Reply Card for more Details

Flat Conveyor

A powered flat conveyor that can travel around almost any curve is being manufactured by Leeds Electric & Mfg. Co., Hartford, Conn. The balanced weave wire mesh belt eliminates wear on the edges of the belt because it does not drag against



the guides. Conveyor may be used in conjunction with other flat conveyors or the entire conveyor, including straight and curved runs, may be continuous.

Check No. 25 on Reply Card for more Details

Photomicrography Meters

Required exposure time in black and white and color photomicrography as well as metallography may be photoelectrically determined with the model 200-M, 500-M 512-M exposure photometer, made by Photovolt Corp., 95 Madison Ave., New York 16, N. Y. For determining exposure, the total light beam at the microscope exit may be measured or the light in the focal plane of the camera may be measured. In either these photometers are offered for both types of measurements.

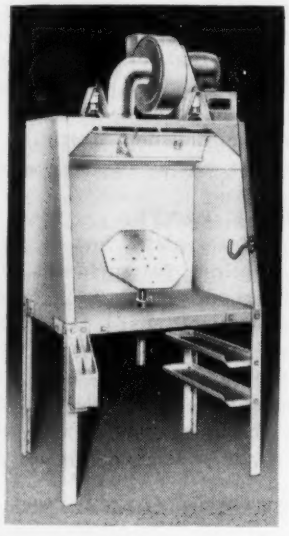
Model 200-M operates a self-generating photocell and does not require power connection or battery. Sensitivity of the instrument is about 20 times higher than that of pocket

type exposure meters. It has a two-position range switch. Model 500-M is approximately 100 times more sensitive than model 200-M; it operates from the alternating current power line. Each of its four measuring ranges decrease in sensitivity in the ratio of 10 to 1. Model 512-M is 20 times higher in sensitivity than 500-M. It operates from built-in dry cell batteries and has two measuring ranges.

Check No. 26 on Reply Card for more Details

Welding Cabinet

Controlled ventilation is incorporated in the combined welding table and fume collector cabinet available from Ruemelin Mfg. Co., 3860 N. Palmer St., Milwaukee 12, Wis. Standard cabinet size is 28 x 36



inches and height is 70 inches overall. Table height is adjustable from 30 x 36 inches above the floor.

An individual fan, direct connected to 1/3-hp motor can be furnished or several cabinets can be connected to multiple piping system. Designed for either left or right hand service, the cabinet is equipped with four pocket electrode rack, tool storage shelves, insulated hanger for rod holder and electric spot lights.

Check No. 27 on Reply Card for more Details

Sand Core Dryer

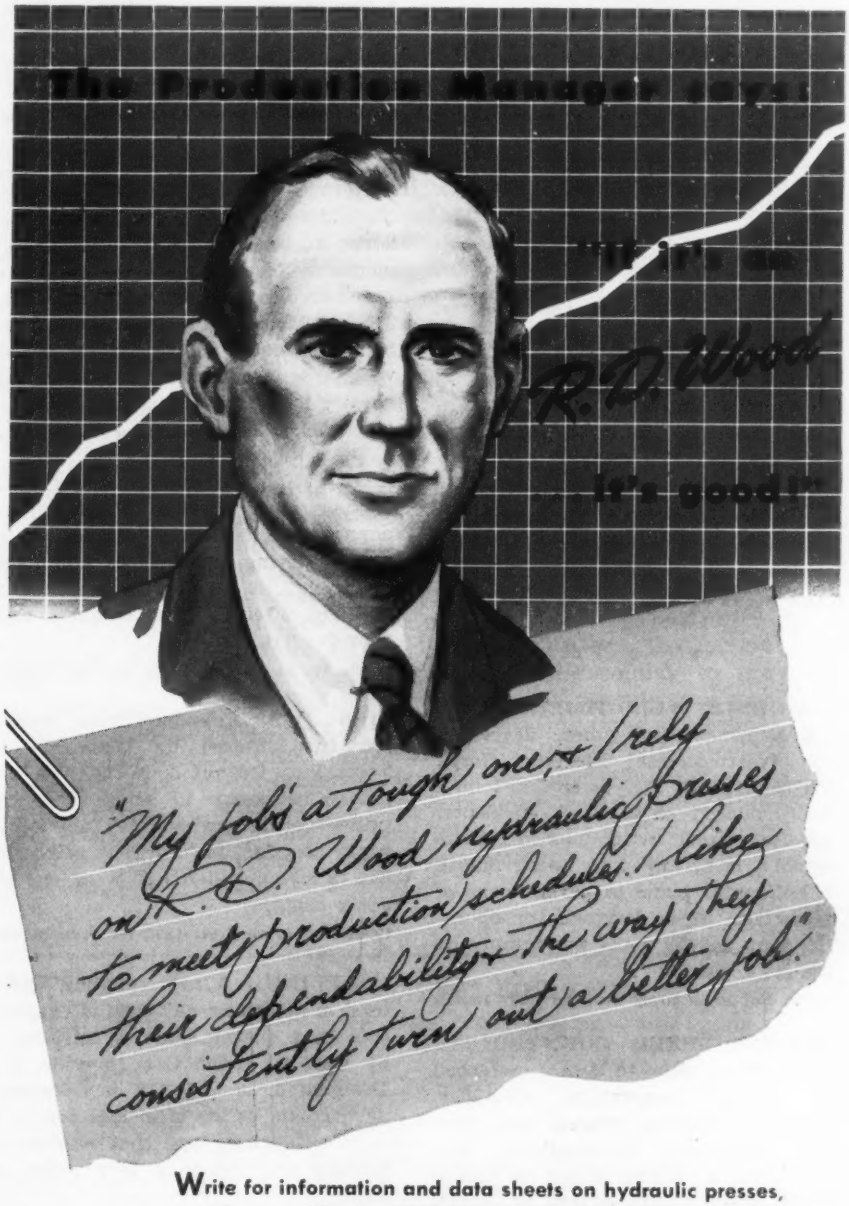
Streamlined foundry production and co-ordinate core room and molding floor operations may be set up with the use of the Foundromatic dielectric sand core dryer, announced by Allis-Chalmers Mfg. Co., 1021 S. 70th St., Milwaukee, Wis. Unit consists of a radio frequency heater, oven with electrodes, tuning assembly, ventilating system and end conveyors for loading and unloading. It is adaptable where resin binders are used and results in improved core quality, increased production, reduced costs, greater flexibility and better working conditions.

Core-making techniques need not be modified when changing to dielectric core drying. A fairly wide range of core sizes can be handled by this method, since the heat developed is uniform in the core and drying not dependent upon thermal conduction from an external heat source. Green cores may be placed on the in-feed belt as soon as they are made and dried cores taken from the belt to the sorting table or molding floor without cooling. Heat radiation into the room is negligible and all gasses are exhausted outside the building.

Check No. 28 on Reply Card for more Details

Turret Lathe Attachment

Operator of a turret lathe may have a more sensitive feel of work being done with the Star turret attachment, offered by Williams & Hussey Machine Co. Inc., Wilton, N. H. Tapping from 6/32 to 4 inches and


"My job's a tough one, so I rely on R. D. Wood hydraulic presses to meet production schedules. I like their dependability + the way they consistently turn out a better job."

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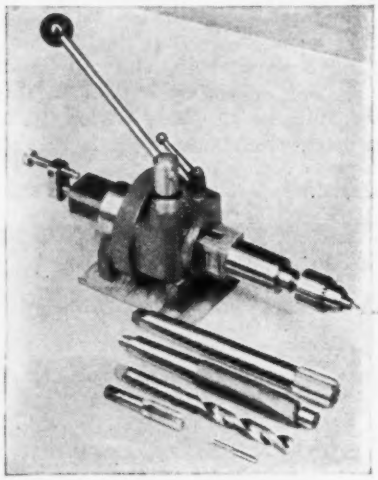
operations such as centering, drilling, reaming and counterboring can be done with greater ease and less tool breakage.

Attachment is mounted on any one of the turret positions and a handwheel brings the turret up near the work. Using the lever arm to control in-and-out motion, the operator has finger-tip control of the operation to be done. The front of the attachment is cylindrical and is equipped with a No. 4 Morse taper hole, drift pin and shear pin holes. Attachment is available in five sizes, mounting directly on turrets with or without adapters, depending on the make and model of the lathe being used.



Check No. 29 on Reply Card for more Details

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SEQUENCE WELD-TIMER: NEMA 3B sequence weld-timer, developed by Westinghouse Electric Corp., Pittsburgh 30, Pa., is enclosed in a wall-mounted sheet steel enclosure. Interior panel, with plug-in subassembly, is arranged to swing out in a horizontal plane to permit ease of servicing. It is designed for operations up to 450 spots per minute on 20 gage steel.

Check No. 30 on Reply Card for more Details

CLUTCH SPEED COUNTER: To check revolutions to determine speed of motors, generators, machines, spindles, grinding wheels and similar equipment, Veeder-Root Inc., Hartford 2, Conn., offers a clutch speed counter. It counts to 10,000 and repeats.

Check No. 31 on Reply Card for more Details

HEX NUT: Designated as Tufflok nut, a new self-locking hex nut with an improved insert is offered by Townsend Co., New Brighton, Pa. It features a hexagonal locking insert to prevent it from rotating with the nut and assure a tight grip at all times. It is available in sizes 4 through ⅜-inch.

Check No. 32 on Reply Card for more Details

BALLAST: A new instant-start, 40-w Tulamp ballast designed for operation under extreme cold weather conditions has been announced by General Electric's Specialty Transformer and Ballast Divisions, Schenectady 5, N. Y.

Check No. 33 on Reply Card for more Details

CHUCK: Model '03 chuck, offered by Erickson Tools Division, Cleveland 14, O., is designed to allow for a minimum center distance of as close as 9/16-inch. It accommodates the company's standard precision collets.

Check No. 34 on Reply Card for more Details

SPECIMEN TUBES: Harry W. Dietert Co., Detroit 4, Mich., offers No. 305 Precision specimen tube honed to a finish of 3 to 6 microinches root mean square and extremely close dimensional tolerance. No. 315-18 Master Precision specimen tube is also available. It is fitted with a self-contained desiccator and closure to preserve finish indefinitely.

Check No. 35 on Reply Card for more Details

LACQUER THINNER: Elston-Nichols Co., Chicago 2, Ill., announces K-105 lacquer thinner. It is a slow-drying product to eliminate "blushing", is water-white so that it will not discolor clear lacquers and provides flat flow-out.

Check No. 36 on Reply Card for more Details

TIPS: With Colmonoy wear resistant tips, offered by Diamonds & Tools Inc., Detroit 3, Mich., it is no longer necessary to scrap lathe or grinder centers when they are worn back too far for further grinding. Tip is silver soldered to wear end of scrap center.

Check No. 37 on Reply Card for more Details

COUPLING: A new coupling to be used in attaching any kind of connection to a power shaft is introduced by Coffing Hoist Co., Danville, Ill. Designated as E-Z Off key locking device, one of its principal features is a self-locking nut that eliminates pinning the nut to a bolt, shaft or axle.

Check No. 38 on Reply Card for more Details

ALLOY STEEL PLATE: W. J. Holliday & Co. Inc., Indianapolis, Ind., announces a new steel, Speed Alloy, a hot rolled alloy steel plate available from stock in widths up to 72 inches and thicknesses to 6 inches. It is essentially an oil hardening steel, affording surface hardness up to 400 Brinell and lends itself to carburizing with resulting high surface hardness.

Check No. 39 on Reply Card for more Details

EXPANSION JOINT: Adsco Corruflex packless expansion joint announced by American District Steam Co., North Tonawanda, N. Y., is suited for use in remote and difficult to service locations. It is available in sizes from 3 to 24 inches, single or multiple corrugation, with or without self-equalizing rings, single or double units and with flanged or welding ends.

Check No. 40 on Reply Card for more Details

GRINDING WHEEL: Simonds Abrasive Co., Philadelphia 37, Pa., announces Fibrex Red wheels, a new type of synthetic resin bonded grinding wheel. Their field of application is between that of heavy grinding and light sanding as well as for certain types of abrasive cutting-off, deburring and finishing operations.

Check No. 41 on Reply Card for more Details

SURFACE PLATE: A heavy cast iron surface plate for laying out work, checking flat surfaces and general toolroom and shop use is available from South Bend Lathe Works, South Bend 32, Ind. Size is 12 x 17 x 3 inches with top ¾-inch thick. V-blocks and angle plates for use with this plate are also available.

Check No. 42 on Reply Card for more Details

DEGREASING AGENT: Called Mulsolv, a new emulsion degreasing agent, has been announced by Bee Chemical Co., Chicago 33, Ill. It is intended for use in standard cleaning equipment for removing grease from metal parts prior to assembly or preliminary to preparation for shipment. It is nontoxic.

Check No. 43 on Reply Card for more Details

VALVE: Installed in the cold blast line between the blowing room and the mixer line connection, the new valves offered by William M. Bailey Co., Pittsburgh, Pa., eliminates the danger of destroying equipment by fires and explosions.

Check No. 44 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

IMPROVEMENT in steel buying is spreading and now involves a wider range of products. Even items in progressively sluggish demand up to the present, such as plates, are showing more life. In some instances producers are increasing furnace and mill rolling schedules. Scrap, traditional barometer for steel, is showing new strength. Whether the pickup signals a definite turn in the steel markets still is anyone's guess, but there is no doubt it is shoring trade sentiment in the face of uncertainties arising from the tense situation in the steel labor dispute. Some observers now regard peaceful settlement of the dispute as no more than a 50-50 possibility.

BUYING—Several factors are contributing to heavier volume demand: 1. Some consumers are taking more steel as insurance against a possible September steel strike; 2. end-use requirements are expanding; 3. seasonal expansion is resulting in more active specifying; 4. inventories at many plants have fallen so low replenishment is imperative. All these add up to a volume of business considerably exceeding expectations of only a month or so ago though demand in general still is sluggish compared with early in the year and relatively prompt shipments from mills are available on most items. Peaceful settlement of the steel dispute might result in cutbacks, especially automotive tonnage, but it is thought avoidance of a strike would encourage a general business expansion that would obviate any great stock adjustments.

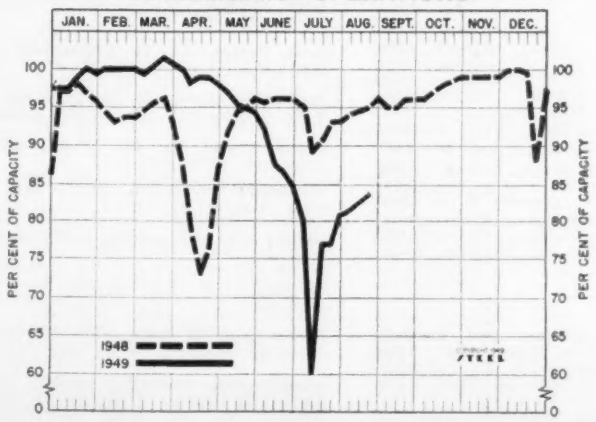
PRODUCT SUPPLY—Structurals are more active because of increasing public work. Volume, however, is insufficient to offset the shrinkage in order backlogs. Structural shapes are in easy supply with standard sections available in three to four weeks. Plate rollings are somewhat heavier, but demand generally lags. Dearth of railroad and ship orders is seriously felt. Some sellers offer deliveries within three weeks. Flat-rolled steel producers are booked up for remainder of this quarter with some tightly scheduled through October on cold-rolled and galvanized sheets. Hot-rolled sheets are available for September delivery; stainless and electrical sheets within three to four weeks; enameling stock within five weeks. Generally, flat-rolled supply appears tightening with automotive requirements heavy and stove and drum makers' specifications increasing. Hot carbon bars are moving faster, deliveries being a little more extended but available in four weeks.

PRICES—With prices moving higher STEEL's composite on steelmaking scrap moved up last week, rising to $21.92 from $20 the preceding wek. A year ago scrap stood at $43.33. The composite price on semifinished steel is now $63.22 compared with $75.75 in the like week last year. Finished steel composite is unchanged at $91.55 and compares with $95.05 a year ago. Steelmaking pig iron composite is steady at $45.60 and compares with $44.32 last year.

OPERATIONS—Steelmaking operations last week attained a new high since June, rising to 83.5 per cent of capacity.

SCRAP, PIG IRON—Steel scrap prices have advanced sharply. The rise, largely, is attributable to stronger trade sentiment since only light mill buying is reported. Brokers are offering $23 per ton in covering contracts for steelmaking scrap ordered by the mills at $21. In absence of representative mill purchases, brokers' offerings are setting the market pace. Consumers are moving cautiously. While coming to the view the market has taken a definite turn upward they do not anticipate any rapid succession of price increases. They still hold large stocks, and dealers' inventories at some points are substantial. Pig iron is moving slowly to foundries with metal being piled in furnace yards. Some buying is expected in September should a steel strike be averted.

STEELWORKS OPERATIONS



DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Aug. 20	Change	Same Week 1948	Same Week 1947
Pittsburgh	79	+ 1	93	95
Chicago	91.5	+ 3*	94	90.5
Eastern Pa.	75.5	+ 2	91	93
Youngstown	88	None	103	92
Wheeling	91.5	— 0.5	93	89
Cleveland	98	— 0.5	97	93
Buffalo	101	+ 5	101.5	88.5
Birmingham	100	None	100	99
New England	62	+ 4	83	92
Cincinnati	87	— 4	102	87
St. Louis	87	+14	80	92
Detroit	96	— 4	99	88
Western	79	+ 2	..	..
Estimated national rate	83.5	+ 1	95	93

Based on weekly steelmaking capacity of 1,843,516 net tons for 1949; 1,802,476 tons, 1948; 1,749,928 tons, 1947. * From revised rate.

News Summary—P. 29 *Engineering News—P. 59*

COMPOSITE MARKET AVERAGES

Arithmetical Price Composites*

	Aug. 20	Aug. 13	Month Ago July 1949	Year Ago Aug. 1948	5 Years Ago Aug. 1944
Finished Steel	$91.55	$91.55	$91.82	$95.05	$56.73
Semifinished Steel	63.22	62.12	62.37	75.75	36.00
Steelmaking Pig Iron	46.60	46.60	45.60	44.12	23.00
Steelmaking Scrap	21.92	20.00	19.21	43.33	19.17

FINISHED STEEL WEIGHTED COMPOSITE†

June 1949	4.01731c
May 1949	4.01731c
Apr. 1949	4.02031c
June 1948	3.57740c
June 1944	2.46683c

* **STRAIGHT ARITHMETICAL COMPOSITES:** Computed from average industry-wide mill prices on Finished Carbon Steel (hot-rolled sheets, cold-rolled sheets, cold-rolled strip, hot-rolled bars, plates, structural shapes, basic wire, standard nails, tin plate, standard and line pipe), on Semifinished Carbon Steel (rerolling billets and slabs, sheet bars, skelp, and wire rods), on Basic Pig Iron (at eight leading producing points), and on Steelworks Scrap (No. 1 melting grade at Pittsburgh, Chicago and eastern Pennsylvania). Steel arithmetical composites, dollars per net ton; pig iron and scrap, gross ton.

† **FINISHED STEEL WEIGHTED COMPOSITE:** Computed in cents per pound, mill prices, weighted by actual monthly shipments of following products, representing about 82 per cent of steel shipments in the latest month for which statistics are available, as reported by American Iron & Steel Institute: Structural shapes; plates, standard rails; hot and cold-finished carbon bars; black butt weld pipe and tubes; black lap weld pipe and tubes; black electric weld pipe and tubes; black seamless pipe and tubes; drawn wire; nails and staples; tin and terne plate; hot-rolled sheets; cold-rolled sheets; galvanized sheets; hot-rolled strip; and cold-rolled strip. June, 1949, figure is preliminary.

COMPARISON OF PRICES

Representative market figures for current week; average for last month, three months and one year ago. Finished material (except tin plate) and wire rods, cents per lb; semifinished (except wire rods) and coke, dollars per net ton, others dollars per gross ton. Delivered prices represent lowest from mills.

Finished Materials

	Aug. 20, 1949	July, 1949	May, 1949	Aug., 1948
Steel bars, Pittsburgh mills	3.35c	3.35c	3.35c	3.45c
Steel bars, del. Philadelphia	3.8164	3.8164	3.8164	3.79
Steel bars, Chicago mills	3.35	3.35	3.35	3.35
Shapes, Pittsburgh mills	3.25	3.25	3.25	3.275
Shapes, Chicago mills	3.25	3.25	3.25	3.25
Shapes, del. Philadelphia	3.4918	3.4918	3.4918	3.48
Plates, Pittsburgh mills	3.40	3.40	3.40	3.50
Plates, Chicago mills	3.40	3.40	3.40	3.40
Plates, del. Philadelphia	3.5848	3.5848	3.6348	3.71
Sheets, hot-rolled, Pittsburgh mills	3.25	3.25	3.25	3.275
Sheets, cold-rolled, Pittsburgh	4.00	4.00	4.00	4.00
Sheets, No. 10 galv., Pittsburgh	4.40	4.40	4.40	4.40
Sheets, hot-rolled, Gary mills	3.25	3.25	3.25	3.25
Sheets, cold-rolled, Gary mills	4.00	4.00	4.00	4.00
Sheets, No. 10 galv., Gary mills	4.40	4.40	4.40	4.40
Strip, hot-rolled, Pittsburgh mills	3.25	3.25	3.25	3.275
Strip, cold-rolled, Pittsburgh mills	4.275	4.275	4.375	4.375
Bright basic, wire, Pittsburgh	4.15	4.15	4.15	4.325
Wire nails, Pittsburgh mills	5.15	5.15	5.15	5.775
Tin plate, per base box, Pitts. dist.	$7.75†	$7.75†	$7.75†	$6.80

Semifinished

Sheet bars, mill	$60.00	$67.00*	$67.00*	$67.00*
Slabs, Chicago	52.00	52.00	52.00	52.00
Rerolling billets, Pittsburgh	52.00	52.00	52.00	59.00
Wire rod 7/32 to ¼-inch, Pitts. dist.	3.40c	3.40c	3.775c	3.775c

† 1.50 lb coating.
* Nominal.

Pig Iron

	Aug. 20, 1949	July, 1949	May, 1949	Aug., 1948
Bessemer, del. Pittsburgh (N.&S. sides)	$48.08	$48.08	$48.08	$48.08
Basic, Valley	46.00	46.00	46.00	43.00
Basic eastern, del. Philadelphia	49.39	49.39	49.39	46.17
No. 2 fdry., del. Pgh. (N.&S. sides)	47.58	47.58	47.58	47.58
No. 2 fdry., del. Philadelphia	49.89	49.89	49.89	46.67
No. 2 foundry, Chicago	46.50	46.31	46.25	43.25
No. 2 foundry, Valley	46.50	46.50	46.50	43.50
Southern No. 2 Birmingham	39.38	39.38	39.88	43.38
Southern No. 2 del. Cincinnati	45.43	45.43	49.43	49.09
Malleable, Valley	46.50	46.50	46.50	43.50
Malleable, Chicago	46.50	46.50	46.50	43.50
Charcoal, low phos., fob Lyles, Tenn.	66.00	66.00	66.00	62.00
Ferromanganese, f.o.b. Etna, Pa.	175.00	175.00	170.20	148.00

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$23.00	$21.00	$23.25	$42.75
Heavy melt. steel, No. 2, E. Pa.	18.75	16.125	19.56	41.50
Heavy melt. steel, No. 1, Chicago	22.50	19.50	21.50	41.75
Heavy melt. steel, No. 1, Valley	23.75	18.50	22.00	42.75
Heavy melt. steel, No. 1, Cleveland	20.00	15.00	18.50	42.25
Heavy melt. steel, No. 1, Buffalo	24.25	19.50	22.81	46.56
Rails for rerolling, Chicago	34.50	27.75	27.75	64.13
No. 1 cast, Chicago	39.00	29.00	27.50	70.75

Coke

Connellsville, beehive furnace	$13.25	$13.25	$14.25	$14.38
Connellsville, beehive foundry	15.75	15.75	16.75	17.00
Chicago, oven foundry, ovens	20.00	20.00	20.40	20.40

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per net ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, nominal. Forging quality, $50 per net ton, mill.

Alloy Steel Ingots: $51 per net ton, mill.

Rerolling Billets, Blooms, Slabs: $52 per net ton, mill, except: $57, Conshohocken, Pa.; $71, Fontana, Calif.

Forging Quality Billets, Blooms, Slabs: $61 per net ton, mill, except: $63, Conshohocken, Pa.; $80, Fontana, Calif.

Alloy Billets, Slabs, Blooms: Rerolling quality, $63 per net ton, mill except: $65 Conshohocken, Pa.; $82, Fontana, Calif.

Sheet Bars: $60 per gross ton, Mansfield, O.; $52 on open market.

Skelp: 3.25c per lb, mill.

Tube Rounds: $76 per net ton, mill.

Wire Rods: Basic and acid open-hearth, 7/32 & ⅜-inch, inclusive, 3.40c per lb, mill, except: 3.70c, Worcester, Mass.; 4.05c, Pittsburg, Calif.; 4.10c, Los Angeles; 4.20c, Torrance, Calif. Basic open hearth and bessemer, 7/32 to 47/64-in., inclusive, 3.50c, Sparrows Point, Md.

Bars

Hot-Rolled Carbon Bars (O.H. only; base 20 tons): 3.35c, mill, except: 3.50c Atlanta; 3.55c, Ecorse, Mich.; 3.75c, Houston; 3.95c, Kansas City; 4.00c, Fontana, Calif.; 4.05c, Pittsburg, Torrance, Calif.; 4.10c, S. San Francisco, Los Angeles, Niles, Calif.; Portland, Oreg., Seattle; 4.10c, Minnequa, Colo.

Rail Steel Bars: (Base 10 tons): 3.35c Huntington, W. Va., Moline, Ill., Williamsport, Pa.

Hot-Rolled Alloy Bars: 3.75c, mill, except: 4.05c, Ecorse, Mich.; 4.80c, Los Angeles; 4.75c, Fontana, Calif.

Cold-Finished Carbon Bars (Base 40,000 lb and over): 4.00c, mill, except: 3.95c, Pittsburgh, Cumberland, Md.; 4.20c, Indianapolis; 4.30c, Ecorse, Mich.; 4.35c, St. Louis; 4.25c, Plymouth, Mich.; 4.40c, Newark, N. J.; Hartford, Putnam, Conn., Mansfield, Readville, Mass.; 4.48c, Camden, N. J.; 5.40c, Los Angeles.

Cold-Finished Alloy Bars: 4.65c, mill, except: 4.85c, Indianapolis; 4.95c, Worcester, Mansfield, Mass., Hartford, Conn.

High-Strength, Low-Alloy Bars: 5.10c, mill, except: 5.30c, Ecorse, Mich.

Reinforcing Bars (New Billet): 3.35c, mill, except: 3.50c, Atlanta; 4.00c, Fontana, Calif.; 3.75c, Houston; 3.95c, Kansas City; 4.05c, Los Angeles, Pittsburg, Torrance, Calif. 4.10c, Seattle, S. San Francisco, 4.25c, Minnequa, Colo. Fabricated: To consumers: 4.25c, mill, except: 5.00c, Seattle.

Reinforcing Bars (Rail Steel): 3.85c, Williamsport, Pa., mill; 3.35c, Huntington, W. Va.

Wrought Iron Bars: Single Refined: 8.60c, (hand puddled), McKees Rocks, Pa.; 9.50c, Economy, Pa. Double Refined: 11.25c (hand puddled), McKees Rocks, Pa.; 11.00c, Economy, Pa. Staybolt: 12.75c, (hand puddled), McKees Rocks, Pa.; 11.30c, Economy, Pa.

Sheets

Hot-Rolled Sheets (18-gage and heavier): 3.25c, mill, except: 3.45c, Ecorse, Mich.; 3.65c, Houston; 3.35c, Conshohocken, Pa., Kokomo, Ind.; 3.95c, Pittsburg, Torrance, Calif.; 4.15c, Fontana, Calif.

Hot-Rolled Sheets (19 gage and lighter, annealed): 4.15c, mill, except: 4.40c, Alabama City, Ala.; 5.00c, Dover, O.; 5.05c, Torrance, Calif.; 4.25c, Kokomo, Ind.

Cold-Rolled Sheets: 4.00c, mill, except: 4.20c, Ecorse, Mich., Granite City, Ill.; 4.90c, Fontana, Calif.; 4.95c, Pittsburg, Calif.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) 4.40c, mill except: 4.50c, Kokomo, Ind.; 5.15c, Pittsburg, Torrance, Calif.; 5.40c, Dover, O.

Galvannealed Sheets: 4.95c, mill, except: 5.05c, Kokomo, Ind.

Culvert Sheets, No. 16 flat Copper Steel (based on 5-cent zinc): 5.00c, mill, except: 5.40c, Granite City, Ill., Kokomo, Ind.; 5.75c, Pittsburg, Torrance, Calif.

Long Ternes, No. 10 (Commercial quality): 4.80c, mill.

Enameling Sheets, No. 12: 4.40c mill, except: 4.60c Granite City, Ill.; 4.70c, Ecorse, Mich.

Silicon Sheets, No. 24: Field: 5.15c, mill. Armature: 5.45c, mill.

Electrical: Hot-rolled, 5.95c, mill, except: 6.15c, Granite City, Ill.

Motor: 6.70c mill, except: 6.90c, Granite City, Ill.

Dynamo: 7.50, mill, except: 7.70c, Granite City, Ill.

Transformer 72, 8.05c, mill; 65, 8.60c, mill, 58, 9.30c, mill, 52, 10.10c, mill.

High-Strength Low-Alloy Sheets: Hot-rolled, 4.95c, mill, except: 5.15c, Ecorse, Mich. Galvanized (No. 10), 6.75c, mill. Cold-rolled, 6.05c, mill, except: 6.25c, Ecorse, Mich.

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Strip

Hot-Rolled Strip: 3.25c mill, **except:** 3.40c, Atlanta; 3.45c, Detroit, Ecorse, Mich.; 3.65c, Houston; 3.85c, Kansas City, Mo.; 4.00c, Los Angeles, S. San Francisco, Pittsburg, Torrance, Calif.; 4.25c, Seattle, 4.30c, Minnequa, Colo.; 4.10c, Fontana, Calif. One company quotes 4.90c, Pittsburgh base.

Cold-Rolled Strip: (0.25 carbon and less): 4.00c, mill, except: 4.15c, Riverdale, Ill.; 4.20c, Ecorse, Mich.; 4.20-4.25c, Detroit; 4.50c, New Haven and Wallingford, Conn., Boston; 4.50-5.00c, Trenton, N. J.; 4.90c, Fontana, Calif., 5.75c, Los Angeles; 6.10c, Berea, O. One company quotes 4.50c, Pittsburgh base; another, 4.55c, Cleveland or Pittsburgh base, and 4.75c, Worcester, Mass., base.

Cold-Finished Spring Steel: 0.26-0.40 C, 4.00c, mill, except: 4.25c, Chicago; 4.30c, Worcester, Mass.; 4.50c, Boston, Youngstown, Wallingford, Conn.

Over 0.40 to 0.60 C, 5.50c, mill except: 5.65c, Chicago; 5.80c, Worcester, Mass., Wallingford, Conn., Trenton, N. J.; 5.95c, Boston. Over 0.60 to 0.80 C, 6.10c, mill, except: 6.25c, Chicago; 6.40c, Worcester, Mass., Wallingford, Bristol, Conn., Trenton and Harrison, N. J.

Over 0.80 to 1.05 C, 8.05c, mill, except: 7.85c, Dover, O.; 8.20c, Chicago; 8.35c, Worcester, Mass., Bristol, Conn., Trenton and Harrison, N. J.

Over 1.05 to 1.35 C, 10.35c, mill, except: 10.15c, Dover, O.; 10.50c, Chicago; 10.65c, Worcester, Mass., Trenton and Harrison, N. J.

Cold-Rolled Alloy Strip: 9.50c, mill except: 9.80c, Worcester, Mass., Harrison, N. J.

High-Strength, Low-Alloy Strip: Hot-rolled, 4.95c, mill, except: 5.15c, Ecorse, Mich. Cold-rolled, 6.05c, mill, except: 6.25c, Ecorse, Mich.

Tin, Terne, Plate

Tin Plate: American Coke, per base box of 100 lb, 1.25 lb coating $7.50-$7.70; 1.50 lb coating $7.75-$7.95. Pittsburg, Calif., mill $8.25 and $8.50, respectively, for 1.25 and 1.50 lb coatings.

Electrolytic Tin Plate: Per base box of 100 lb. 0.25 lb tin, $6.45-$6.65; 0.50 lb tin, $6.70-$6.90; 0.75 lb tin, $7.00-$7.20.

Can Making Black Plate: Per base box of 100 lb, 55 to 128 lb basis weight $5.75-$5.85. Pittsburg, Calif., mill, $6.50.

Holloware Enameling Black Plate: 29-gage, 5.30c per pound, except: 5.50c, Granite City, Ill.

Manufacturing Ternes (Special Coated): Per base box of 100 lb, $6.65, except: $6.75 Fairfield, Ala.

Roofing Ternes: Per package 112 sheets; 20 x 28 in., coating I.C. 8-lb, $17.50.

Plates

Carbon Steel Plates: 3.40c, mill, except: 3.50c, Coatesville, Pa., Claymont, Del., Conshohocken, Pa., Harrisburg, Pa.; 3.65c, Ecorse, Mich.; 3.80c, Houston; 4.00c, Fontana, Calif.; 4.30c, Seattle, Minnequa, Colo.; 6.25c, Kansas City, Mo.

Floor Plates: 4.55c, mill.

Open-Hearth Alloy Plates: 4.40c, mill, except: 4.50c, Coatesville, Pa., mill.

High-Strength, Low-Alloy Plates: 5.20c mill, except: 5.40c, Ecorse, Mich.

Shapes

Structural Shapes: 3.25c, mill, except: 3.30c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.; 3.65c, Houston; 3.80c, S. San Francisco, Fontana, Calif.; 3.85c, Kansas City, Mo., Los Angeles, Torrance, Calif.; 3.90c, Seattle; 3.75c, Minnequa, Colo.

Alloy Structural Shapes: 4.05c, mill.

Steel Sheet Piling: 4.05c, mill.

High-Strength, Low-Alloy Shapes: 4.95c, mill, except: 5.05c, Bethlehem, Johnstown, Pa., Lackawanna, N. Y.

Wire and Wire Products

Wire to Manufacturers (carloads): Bright, Basic or Bessemer Wire, 4.15c, mill, except: 4.25c, Sparrows Point, Md., Kokomo, Ind.; 4.45c, Worcester, Palmer, Mass.; 4.50c, Minnequa, Colo., Atlanta; 4.75c, Kansas City, Mo.; 5.10c, Pittsburg, Calif.; 5.10c, S. San Francisco. One producer quotes 4.15c, Chicago base; another 4.30c, Crawfordsville, Ind., freight equalized with Pittsburgh, Birmingham, Chicago, Houston.

Basic MB Spring Wire, 5.55c, mill, **except:** 5.65c, Sparrows Point, Md.; 5.85c, Worcester, Palmer, Mass., Trenton, N. J.; 6.50c, Los Angeles, Pittsburg, Calif.

Upholstery Spring Wire, 5.20c mill, except: 5.30c, Sparrows Point, Md., 5.50c Worcester, Mass., Trenton, N. J., New Haven, Conn.; 6.15c, Los Angeles, Pittsburg, Calif.

Wire Products to Trade (carloads): Merchant Quality Wire: Annealed (6 to 8 Gage base), 4.80c, mill except: 4.90c, Sparrows Point, Md., Kokomo, Ind.; 4.95c, Atlanta; 5.10c Worcester, Mass.; 5.15c, Minnequa, Colo.; 5.75c, S. San Francisco, Los Angeles, Pittsburg, Calif. One producer quotes 4.80c, Chicago and Pittsburgh base; another, 4.95c, Crawfordsville, Ind., freight equalized with Pittsburgh, Birmingham, Chicago and Houston.

Galvanized (6 to 8 Gage base): 5.25c, mill, except: 5.35c, Sparrows Point, Md., Kokomo, Ind.; 5.40c, Atlanta; 5.55c, Worcester, Mass.; 5.60c, Minnequa, Colo.; 6.20c, Pittsburg, S. San Francisco, Calif. One producer quotes 5.25c, Pittsburgh and Chicago base; another, 5.40c, Crawfordsville, Ind., freight equalized with Birmingham, Pittsburgh, Chicago, Houston.

Nails and Staples: Standard, cement-coated and galvanized nails and polished and galvanized staples, Col. 103, mill, except: 105, Sparrows Point, Md., Kokomo, Ind., Atlanta; 109, Worcester, Mass.; 110, Minnequa, Colo., Cleveland; 122, Pittsburg, Calif., 123, Torrance, Calif. One producer quotes Col. 103, Chicago and Pittsburgh base; another, Col. 106, Crawfordsville, Ind., freight equalized with Birmingham, Pittsburgh, Chicago, Houston.

Woven Fence (9 to 15½ Gage, inclusive): Col. 109, mill, except: 111, Kokomo, Ind., Atlanta; 116, Minnequa, Colo.; 132, Pittsburg, Calif. One producer quotes Col. 109, Pittsburgh and Chicago base; another, Col. 112, Crawfordsville, Ind., freight equalized with Pittsburgh, Birmingham, Chicago, Houston.

Barbed Wire: Col. 123 mill, except: 125, Sparrows Point, Md., Kokomo, Ind., Atlanta; 130, Minnequa, Colo.; 143, Pittsburg, Calif.; 143 S. San Francisco. One producer quotes Col. 123, Chicago and Pittsburgh base; another, Col. 126, Crawfordsville, Ind., freight equalized with Birmingham, Pittsburgh, Chicago, Houston.

Fence Posts (with clamps): Col. 112, Duluth, Jolliet, Ill.; Johnstown, Pa.; 116, Moline, Ill.; 122, Minnequa, Colo.; $120 per net ton, Williamsport, Pa.

Bale Ties (single loop): Col. 106, mill, except: 107, Atlanta; 108, Sparrows Point, Md., Kokomo, Ind.; 113, Minnequa, Colo.; 130, S. San Francisco, Pittsburg, Calif. One producer quotes Col. 109, Crawfordsville, Ind., freight equalized with Birmingham, Pittsburgh, Chicago and Houston.

Stainless Steels

(Mill prices, cents per pound)

CHROMIUM NICKEL STEELS

Type No.	Bars, Wire Shapes	Strip, Cold-Rolled	Sheets
301	28.50	30.50	37.50
302	28.50	33.00	37.50
303	31.00	36.50	39.50
304	30.00	35.00	39.50
316	46.00	55.00	53.00
321	34.00	44.50	45.50
347	38.50	48.50	50.00

STRAIGHT CHROMIUM STEELS

410	23.00	27.00	33.00
416	23.50	33.50	33.50
420	28.50	43.50	40.50
430	23.50	27.50	35.50
442	27.00	39.00	39.50
446	32.50	60.00	50.00

STAINLESS-CLAD STEELS

	Plates —Cladding— 10%	Plates —Cladding— 20%	Sheets —Cladding— 10%	Sheets —Cladding— 20%
302	....	....	19.75	21.50
304	22.50	26.50	20.75	22.50
310	32.50	36.50	....	....
316	27.00	31.00	26.00	28.00
321	23.50	27.50	....	....
347	25.00	29.00	24.00	26.00
405	18.75	24.75	....	....
410	18.25	24.25	....	....
430	18.25	24.25	....	....

Tool Steels

Tool Steel: Cents per pound, producing plants: reg. carbon 19.00c; extra carbon 22.00c; special carbon 26.50c; oil-hardening 29.00c; high carbon-chromium 52.00c; chrome hot work, 29.00c.

W	Cr	V	Mo	Co	Base Per lb
18	4	1	...	...	90.50c
18	4	2	...	...	102.50c
18	4	3	...	...	114.50c
18	4	2	...	9	168.50c
1.5	4	1	8.5	...	65.00c
6.4	4.5	1.9	5	...	69.50c
6	4	3	6	...	88.00c

Bolts, Nuts

Prices to consumers, f.o.b. midwestern plants. Sellers reserve right to meet competitors' prices, if lower. Additional discounts on carriage and machine bolts, 5 for carloads; 15 for full containers, except tire and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	35 off
⅞ and ⅝ x 6 in. and shorter	37 off
¾-in. and larger x 6-in. and shorter	34 off
All diameters longer than 6-in.	30 off
Tire bolts	25 off
Plow bolts	47 off
Lag bolts, 6 in. and shorter	37 off
Lag bolts, longer than 6 in.	35 off

Stove Bolts

In packages, nuts separate, 58½-10 off; bulk 70 off on 15,000 of 3-in. and shorter, or 5000 over 3 in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅞-in. and smaller	41 off	.....
½-in. and smaller	.....	38 off
½-in.-1-in.	39 off	.....
⅝-in.-1-in.	.....	37 off
1⅛-in.-1½-in.	37 off	35 off
1⅝-in. and larger	34 off	28 off

Additional discount of 15 for full containers.

Hexagon Cap Screws (Packaged)

Upset 1-in. smaller by 6-in. and shorter (1020 bright)	46 off
Upset (1035 heat treated) ⅝ and smaller x 6 and shorter	40 off

Square Head Set Screws

Upset 1-in. and smaller	51 off
¾, ⅞, & 1 x 6-in. and shorter	35 off
Headless, ¼-in. and larger	31 off

Rivets

F.o.b. midwestern plants

Structural ½-in. and larger	6.75c
⅞-in. and under	48 off

Washers, Wrought

F.o.b. shipping point, to jobbers. .Net to $1 off

Tubular Goods

Standard Steel Pipe: Eastern mill carlot prices, threaded and coupled, to consumers about $200 a net ton. Discounts from base:

Butt Weld

In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	39½–	11–	1	46½–	30½–
	41½	13½		48½	33½
¼	37½–	13–	1¼	47–	31–
	39½	15½		49	34
⅜	34–	9½–	1½	47½–	31½–
	36	12½		49½	34½
½	41–	23½–	2	48–	32–
	43	26½		50	35
¾	44–	27½–	2½, 3	48½–	32½–
	46	30½		50½	35½
			3½ & 4	44½	29

In.	Lap Weld Blk.	Lap Weld Gal.	Elec. Weld Blk.	Elec. Weld Gal.	Seamless Blk.	Seamless Gal.
2	40½	25	38½	23	28–	12½–
					38½	23
2½	44½	29	41½	26	33½–	18–
					41½	26
3	44½	29	41½	26	36–	20½
					41½	26
3½&4	42½–	26–	43½	28	38½–	23–
	46½	31			43½	28
5 & 6	42½–	26–	43½	28	43½	28
	44½	29				
7	....	....	....	....	43½	27

Pipe Cast Iron: Class B, 6-in. and over, $82.50-$93.50 per net ton, Birmingham; $87.50, Burlington, N. J.; 4-in. pipe, $5 higher; Class A pipe, $5 a ton over Class B.

For prices on line and standard wrought iron pipe and boiler tubes, please refer to Aug. 8 issue, page 123.

Rails, Supplies

Rails: Standard, over 60-lb; $3.20 per 100 lb mill.

Light (billet): $3.55 per 100 lb, mill, except: $4.25, Minnequa, Colo.

Light (rail steel): $3.55 per 100 lb, Williamsport, Pa., Huntington, W. Va.

Railroad Supplies: Track bolts, treated: $8.50 per 100 lb, mill. Untreated: $8.25, mill.

Tie Plates: 4.05c mill, except: 4.20c, Pittsburg, Torrance, Calif.; 4.50c, Seattle.

Splice Bars: 4.25c, mill.

Standard Spikes: 5.35c, mill.

Axles: 5.20c, mill.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

Pig Iron

Per Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa., furnace	$48.00	$48.50	$49.00	$49.50
Newark, N. J., del.	50.5334	51.0334	51.5334	52.0334
Brooklyn, N. Y., del.	....	52.634	53.134	....
Birmingham, furnace	38.88	39.38	....	....
Cincinnati, del.	....	45.43	....	....
Buffalo, furnace	46.00	46.50	47.00	....
Boston, del.	54.92	55.42	55.92	....
Rochester, del.	47.95	48.45	48.95	....
Syracuse, del.	49.39	49.89	50.39	....
§**Chicago,** district furnaces	46.00	46.50	46.50	47.00
Milwaukee, del.	47.82	48.32	48.32	48.82
Muskegon, Mich., del.	....	51.78	51.78	....
Cleveland, furnace	46.00	46.50	46.50	47.00
Akron, del.	48.3002	48.8002	48.8002	49.3002
Duluth, furnace	....	....	46.50	....
Erie, Pa., furnace	46.00	46.50	46.50	47.00
Everett, Mass., furnace	....	50.00	50.50	....
Geneva, Utah, furnace	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	54.0578	....	....
Portland, Oreg., del.	....	54.0578	....	....
Los Angeles, San Francisco	53.5578	54.0578	....	....
Granite City, Ill., furnace	47.90	48.40	48.90	....
St. Louis, del.	48.65*	49.15*	49.65*	....
Ironton, Utah, furnace	46.00	46.50	....	....
Lone Star, Tex., furnace	46.00	†46.50	....	....
Gulf ports, del.	50.50	51.00	....	....
Lorain, O., furnace	46.00	....	....	47.00
Minnequa, Colo., furnace	47.00	47.50	47.50	....
‡**Neville Island, Pa.,** furnace	46.00	46.50	46.50	47.00
Pittsburgh, del., N.&S. Sides	47.08	47.58	47.58	48.08
Pittsburgh (Carnegie), furnaces	46.00	....	46.50	47.00
Sharpsville, Pa., furnace	46.00	46.50	46.50	47.00
Steelton, Pa., furnace	48.00	48.50	49.00	49.50
Steubenville, O., furnace	46.00	....	....	47.00
Struthers, O., furnace	46.00	....	....	....
Swedeland, Pa., furnace	48.00	48.50	49.00	49.50
Philadelphia, del.	49.39	49.89	50.39	50.89
Toledo, O., furnace	46.00	46.50	46.50	47.00
Cincinnati, del.	50.8230	51.3230	....	....
Troy, N. Y., furnace	48.00	48.50	49.00	....
Youngstown, O., furnace	46.00	46.50	46.50	47.00
Mansfield, O., del.	50.1022	50.6022	50.6022	51.1022

* Including 3 per cent federal transportation tax.
† Low phosphorus southern grade.
‡ To Neville Island base add: $0.86 for McKees Rocks, Pa.; $1.31 Lawrenceville, Homestead, McKeesport, Monaca; $1.73 Verona; $1.94 Brackenridge; $1.08 for Ambridge and Aliquippa.
§ Includes Chicago, S. Chicago, Ill., Gary, Indiana Harbor, Ind.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent Si (base)	$59.50		
6.51-7.00	60.50	9.01- 9.50	65.50
7.01-7.50	61.50	9.51-10.00	66.50
7.51-8.00	62.50	10.01-10.50	67.50
8.01-8.50	63.50	10.51-11.00	68.50
8.51-9.00	64.50	11.01-11.50	69.50

F.o.b. Jackson, O., per gross ton. Buffalo furnace $1.25 higher.

Electric Furnace Silvery Pig Iron

Si 14.01-14.50%, $71.50 furnace, Niagara Falls; $77 open-hearth and foundry grades, Keokuk, Iowa, or Wenatchee, Wash., freight allowed to normal trade area; 12½ lb pigs, $82, Keokuk, Iowa, freight allowed to normal trade area. Add $1 a ton for each additional 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 a ton for 0.045% max. P.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. F.o.b. furnace, Lyles, Tenn. ....$66 (For higher silicon iron a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Low Phosphorus

Steelton, Pa., Troy, N. Y., $54; Philadelphia, $56.9786 del. Intermediate phosphorus, Central Furnaces, Cleveland, $51.

Electrodes

(Threaded, with nipples, unboxed)

Diam. (Inches)	Length (Inches)	Cents per lb, f.o.b. plant
Graphite		
17, 18, 20	60, 72	16.00
8 to 16	48, 60, 72	16.50
7	48, 60	17.75
6	48, 60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24, 30	21.00
2	24, 30	23.00
Carbon		
40	100, 110	7.50
35	100, 110	7.50
30	84, 110	7.50
24	72 to 104	7.50
17 to 20	84, 90	7.50
14	60, 72	8.00
10, 12	60	8.25
8	60	8.50

Fluorspar

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $37; less than 60%, $34.

Metallurgical Coke

Price per Net Ton

Beehive Ovens	
Connellsville, furnace	$13.00-13.50
Connellsville, foundry	15.50-16.00
New River, foundry	18.00
Wise county, foundry	15.35
Wise county, furnace	14.60
Oven Foundry Coke	
Kearney, N. J., ovens	$22.00
Everett, Mass., ovens. New England, del.‡	22.70
Chicago, ovens	20.00
Chicago, del.	†21.45
Detroit, del.	23.76
Terre Haute, ovens	20.20
Milwaukee, ovens	20.75
Indianapolis, ovens	19.85
Chicago, del.	23.19
Cincinnati, del	22.66
Detroit, del.	23.61
Ironton, O., ovens	19.40
Cincinnati, del.	21.63
Painesville, O., ovens	20.90
Buffalo, del.	23.42
Cleveland, del.	22.55
Erie, del.	22.70
Birmingham, ovens	17.70
Philadelphia, ovens	20.45
Swedeland, Pa., ovens	20.40
Portsmouth, O., ovens	19.50
Detroit, ovens	20.65
Detroit, del.	*21.70
Buffalo, del	22.95
Flint, del.	23.00
Pontiac, del.	21.98
Saginaw, del.	23.30

Includes representative switching charge of: *, $1.05; †, $1.45. ‡ Or within $4.03 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens (Price effective as of Aug. 5)

Pure benzol	20.00
Toluol, one degree	19.00-23.50
Industrial xylol	20.50-26.50

Per ton bulk, ovens

Sulphate of ammonia	$45.00

Per pound, ovens (Effective June 1, 1949)

Phenol, 40 (carlots, returnable drums)	13.25
Do., less than carlots	14.00
Do., tank cars	12.50
(Effective Oct. 25, 1948)	
Naphthalene flakes, balls, bbl to jobbers, "household use"	13.75

Refractories

(Prices per 1000 brick, f.o.b. plant)

Fire Clay Brick

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $100. Hard-fired, $135 at above points.

High-heat Duty: Salina, Pa., $85; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $80.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $74.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., Ottawa, Ill., $66.

Ladle Brick

Dry Press: $55, Freeport, Merill Station, Clearfield, Pa., Chester, New Cumberland, W. Va.; Irondale, Wellsville, O.

Wire Cut: $53, Chester, New Cumberland, W. Va.; Wellsville, O.

Malleable Bung Brick

St. Louis, Mo., Olive Hill, Ky., Ottawa, Ill., $90; Beach Creek, Pa., $80.

Silica Brick

Mt. Union, Claysburg, or Sproul, Pa., Ensley, Ala., $80; Hays, Pa., $85; Joliet or Rockdale, Ill., E. Chicago, Ind., $89; Lehi, Utah, Los Angeles, $95.

Eastern Silica Coke Oven Shapes: Claysburg, Mt. Union, Sproul, Pa., Birmingham, $80.

Illinois Silica Coke Oven Shapes: Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $81.

Basic Brick

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $66; Chemical-bonded chrome brick, $69; magnesite brick, $91; chemical-bonded magnesite, $80.

Magnesite

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; Bulk, $30.50-31.00; single paper bags, $35.00-35.50.

Dolomite

(Base prices per net ton)

Domestic, dead-burned bulk: Billmeyer, Blue Bell, Williams, Plymouth Meeting, Pa., Millville, W. Va., Narlo, Millersville, Martin, Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Bonne Terre, Mo., $12.45.

Ores

Lake Superior Iron Ore

Gross ton, 51½% (natural) Lower Lake Ports

(Any increase or decrease in R.R. freight rates, dock handling charges and taxes thereon effective after Dec. 31, 1948, are for buyer's account.)

Old range bessemer	$7.60
Old range nonbessemer	7.45
Mesabi bessemer	7.35
Mesabi nonbessemer	7.20
High phosphorus	7.20

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.62% concentrates, contract	16.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%: Spot:	17.00
Long-term contract	15.00
Brazil iron ore, 68-69%	19.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$26-$28

Manganese Ore

Long term contracts, involving large tonnages, prices are nominal; nearby, 48%, duty paid, 81.8c-83.8c per long ton unit, c.i.f. United States ports; prices on lower grades adjusted to manganese content and impurities.

Chrome Ore

Gross ton f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S.C., plus ocean freight differential for delivery to Portland, Oreg., and/or Tacoma, Wash. (S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African 48% 2.8:1	37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal) 44% no ratio	$25.50-26.00
45% no ratio	26.50
48% no ratio	29.00-30.00
50% no ratio	29.50-30.50
Brazilian—nominal 44% 2.5:1 lump	$33.65
Rhodesian 45% no ratio	$27-27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail) 48% 3:1	$39.00

Molybdenum

Sulphide conc., lb, Mo., cont., Mines	$0.[illegible]

WAREHOUSE STEEL PRICES

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga. and Heavier*	C.R. 15 Ga.	Galv. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York (city)	5.60	6.51	7.10	5.82	...	5.77	6.31	8.28	5.53	5.85	7.36
New York(c'try)	5.40	6.31	6.90	5.62	...	5.57	6.11	8.08	5.33	5.65	7.16
Boston (city) ..	5.75	6.75**	7.16	5.80	...	5.72	6.22	8.77	5.62	5.95	7.45
Boston (c'try) .	5.55	6.55**	6.96	5.60	...	5.52	6.02	8.57	5.42	5.75	7.25
Phila. (city)...	5.80	6.39	6.78	5.55	...	5.55	6.09	8.00	5.25	5.60	6.70
Phila. (c'try) ..	5.65	6.24	6.63	5.40	...	5.40	5.94	7.85	5.10	5.35	6.55
Balt. (city)....	5.46	6.36	6.81	5.52	...	5.57	6.31	...	5.51	5.71	7.16
Balt. (c'try)...	5.31	6.21	6.66	5.37	...	5.42	6.16	...	5.36	5.56	7.01
Norfolk, Va. ..	5.80‡	...	...	...	...	6.05	7.05	...	6.05	6.05	7.55
Wash. (w'hse).	6.07‡	...	...	5.83	...	5.88	6.62	...	5.82	6.02	7.47
Buffalo (del.)..	5.00‡	5.90	7.57	5.39	6.42	5.10	5.60	10.13	5.15	5.50	7.06
Buffalo (w'hse)	4.85‡	5.75	7.42	5.24	6.27	4.95	5.40	9.60	5.00	5.35	6.91
Pitts. (w'hse)..	4.85	5.75[4]*	6.80	5.00	6.00	4.90	5.40	9.20††	4.90	5.05	6.55
Detroit (w'hse)	5.32	6.22[4]*	7.35	5.42	6.42-6.73	5.48	5.90	8.44-8.59	5.48	5.67	7.02
Cleveland (del.)	5.00	5.90	6.70	5.15-5.18	6.15	5.15-5.16	5.60	7.84-8.00	5.15-5.16	5.35-5.36	6.80-6.81
Cleve. (w'hse).	4.85	5.75	6.55	5.00-5.03	6.00	5.00-5.01	5.45	7.84-7.85	5.00-5.01	5.20-5.21	6.65-6.66
Cincin. (w'hse).	5.26‡	5.94**	6.83	5.38	6.10	5.43	5.94	...	5.43	5.63	7.03
Chicago (city) .	5.00-5.20‡	5.90[4]	7.00	5.00	6.67-6.83	5.05	5.60	7.85[5]	5.05	5.25	6.70
Chicago (w'hse)	4.85-5.05‡	5.75[4]	6.85	4.85	6.52-6.68	4.90	5.40	7.70[5]	4.90	5.10	6.55
Milwaukee(city)	5.18-5.38‡	6.08[4]	7.18	5.18	6.82-7.01	5.23	5.78	8.03[5]	5.23	5.43	6.88
St. Louis (del.)	5.37	6.27[4]	7.44	5.34	6.64	5.39	6.19[4]	6.64	5.39	5.59	7.04
St. L. (w'hse)..	5.22	6.12[4]	7.29	5.19	6.49	5.24	6.04[4]	6.49	5.24	5.44	6.89
Birm'ham (city)	5.00	5.90	6.55	5.00	...	5.00	6.83	...	5.05	5.25	7.69
Birm'ham(c'try)	4.85	5.75	6.40	4.85	...	4.85	6.68	...	4.90	5.10	7.54
Omaha, Nebr...	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Los Ang. (city)	6.60	8.05**	7.60	6.80	7.75	6.25	8.20	...	6.10	6.30	8.20
L. A. (w'hse)..	6.45	7.90**	7.45	6.65	7.60	6.10	8.05	...	5.95	6.15	8.05
San Francisco..	6.15[10]	7.50[3]	8.10	6.75[10]	8.25[3]	5.90[10]	7.55	10.85[3]	5.90	6.35	8.10
Seattle-Tacoma.	6.70[2]‡	8.15[3]	8.80	6.70[7]	...	6.20[7]	8.15[1]	10.35	6.00[7]	6.35[7]	8.40[9]

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ as rolled; ** 17 gage; †† as annealed.

Base quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 1000 lb and over; galvanized sheets, 450 lb to 1499 lb; [1]—1500 lb and over; [2]—1000 to 4999 lb; [3]—450 to 1499 lb; [4]—400 to 1499 lb; [5]—1000 to 1999 lb; [6]—1000 lb and over; [7]—300 to 9999 lb; [8]—1500 to 1999 lb; [9]—400 to 3999 lb; [10]—400 lb and over; [11]—500 to 1499lb.

PRICES OF LEADING FERROALLOY PRODUCTS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si) Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C 7% approx.) Carload, lump, bulk $172 per gross ton of alloy, c.l., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces; $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 0.75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal: (Mn 96% min., Fe 2% max., Si 1% max., C 0.20% max.). Carload 2" x D, packed 35.5c per lb of metal, ton lot 37c, less ton 39c. Delivered. Spot, add 2c.

Manganese, Electrolytic: Less than 250 lb, 35c; 250 lb to 1999 lb, 32c; 2000 to 35,999 lb, 30c; 36,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17.5%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr, c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., 8MxD, bulk 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lot 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract, carload, 1" x D; packed, max. 0.50% C grade, $1.03 per lb of contained chromium, ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si; packed 19.90-21.70c; ton lot 21.00-22.60c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe.) C.l., lump, bulk, regular 19.0c per lb of Si c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.40c per lb of alloy, ton lots packed 8.80c, 200 to 1999 lb 9.15c, smaller lots 9.65c. Delivered. Spot up 0.5c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk, 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size — weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ton 8.65c. Delivered. Spot, add 0.25c.
(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lots 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained. F.o.b. Langeloth, Pa.

(Please turn to Page 138)

Lead Moves Fractionally Higher

St. Joseph Lead Co. advances prices 1/8-cent to basis of 14.92½c, St. Louis. Closer balance between demand and supply develops in other major metals.

New York—A 1/8-cent advance in lead, posted by St. Joseph Lead Co. on Aug. 18, featured developments in nonferrous metal markets last week. Both selling and buying pressure was absent in copper and zinc as a better balance has been attained between supply and demand.

Copper—Volume transacted in the copper market continues satisfactory on the basis of 17.62½c, Valley, for electrolytic. Small tonnages are being booked in the export market at 17.62½c, f.a.s. New York.

London cables report Japan is offering between 4000 and 5000 tons of copper, most of it in cathode form and the balance in wire bars. Reported asking price is the equivalent of 17.62½c, f.a.s. New York.

Copper statistics for July, reported by the Copper Institute, tend to strengthen the market undertone. Despite widespread vacation shutdowns of consuming plants in that month, copper deliveries held at 45,316 tons compared with 45,653 in June and only 32,566 in May.

Reflecting curtailment of operations earlier in the year at many western properties, crude copper production from primary sources dropped to 56,630 tons in July from 63,639 in June and 79,256 in March. Output from secondary sources declined to 6005 tons from 8412 in June and 17,867 in March. Production at refineries showed a similar trend, falling to 85,638 tons in July from 92,118 in June and 88,165 in March.

Refined copper stocks at the end of July totaled 212,817 tons, an increase of 45,892 tons from the June figure of 166,925 tons.

Lead—The advance in lead on Aug. 18 reflected the improved outlook for consumption over the remainder of this year coupled with prospects of substantial buying by the government.

Most producers are well booked for delivery this month and some have substantial tonnages on order for September delivery. Total sold this month is more than double that in either April or May and is the largest for any month since January. Bulk of business is being done on an average price basis, although a fair amount is being booked on a flat price basis. Activity in the foreign market is fair with prices holding at 14.62½c, f.a.s. Gulf ports.

The domestic market is bolstered by substantial government purchases for stockpiling through September. Additional large purchases pend for fourth quarter delivery.

Zinc—Production of lead and zinc oxide at American Zinc Co.'s Hillsboro, Ill., mill starts this week while output of slab zinc is scheduled the following week, marking end of a strike which started Aug. 13, 1948. Signing of a two-year contract between the company and the union was announced by Howard I. Young, president, Aug. 12. It is expected the metal division will be running at capacity by Sept. 15.

With the producers' market steady at 10.00c, E. St. Louis, an interesting development is the renewed interest being shown on the Commodity Exchange. Steady buying is recorded at prices holding close to 10.20c for December and early 1950 delivery.

Tin — Market interests are still awaiting the lifting of controls over tin. Announcement had been expected last week. The Reconstruction Finance Corp. has purchased only about 5000 of the 17,100 tons allocated to the United States for the second half of this year. The government agency received 7149 tons in July, consisting of 4239 tons of imports and 2910 tons of output at the Longhorn smelter. Allocations amounted to 3966 tons, bringing the total for the first seven months to 23,116 tons against 35,371 in like 1948 period. It is estimated the government's stockpile now includes about 60,500 tons of tin.

Aluminum—Economic Cooperation Administration's European mission to report on aluminum requirements, reports that, while it found no improprieties on the part of participating countries which had shipped secondary aluminum to the United States while receiving ECA aid in financing imports of virgin aluminum, almost every country could economize on imports by more exhaustive use of secondary aluminum.

The mission reports action to use such material locally instead of exporting it for dollars would materially reduce import requirements of primary metal and thus lessen the drain on primary supplies and the need for use of ECA dollars for this purpose.

Ministry of Supply, London, has raised maximum prices of aluminum ingot £3, or the equivalent of about ½-cent per pound. The new prices are: £93, or 16.74c on the basis of $4.03¼ for sterling exchange for 99 to 99.5 per cent ingot; £101 for 99.6 per cent; £105 for 99.7 per cent; £110 for 99.8 per cent; £143 for 99.9 per cent.

Secondary Lead Output Gains

Washington—Secondary lead smelter operations showed slight gains in May, compared with April, thereby halting the decline which began in November, 1948, Bureau of Mines reports. Smelters reported gains of almost 2 per cent in receipts of scrap and 1 per cent in usable metals recovered.

In May, the price of primary lead, dropped 1 cent on three separate occasions from 15.00c to 12.00c per pound, and scrap and secondary prices were adjusted accordingly. At the end of the month, battery plate smelting charges were being quoted at about $70, compared with approximately $90 on May 1.

The increase in lead scrap receipts was brought about almost entirely by greater intake of battery plates, which advanced from 14,525 tons in April to 17,348 tons in May, a gain of 19 per cent. Of the solid scrap items, only antimonial and cable lead scrap receipts were greater, and of the drosses only solder dross. Intake of all scrap and drosses totaled 32,875 tons.

Treatment of battery plates in May (16,386 tons) showed a slight gain of 291 tons over April. Total May consumption of 34,785 tons was 1 per cent under the preceding month. Smelters' stocks registered a greater change, declining 4 per cent to 45,879 tons on May 31. Inventories on that date consisted of 16,202 tons of battery plates, 11,337 tons of solid scrap and 18,340 tons of drosses and residues.

Receipts of tin-base scrap rose 28 per cent over April to total 385 tons. All tin-base items without exception participated in the general increase. Use of tin scrap was less than intake by 123 tons, thereby raising smelters' stocks 9 per cent to 1454 tons on May 31.

Production by the secondary lead industry totaled 31,048 tons in May and consisted of 21,074 tons of secondary pig metals, 4842 tons of fabricated products and 5132 tons of pig, bar or ingot containing 50 per cent or more of primary metals. The latter figure includes the estimated secondary metal recovered at plants producing mostly primary lead-base products. Use of primary metals in secondary products has shown a consistent decline since the first of the year and in May totaled 2972 tons.

Percentage and remelt metals reshipped within the industry in May totaled 2860 tons divided as follows: 332 tons of solder, 89 tons of lead-base babbitt, 973 tons of soft lead, 1149 tons of antimonial lead, 22 tons of cable lead, 133 tons of type metals, 158 tons of tin babbitt and 4 tons of pewter.

In addition to the reshipped secondary metals, 25,525 tons were shipped to consumers. Smelters' stocks decreased during the month from 43,511 to 39,060 tons.

Foundry Use of Brass Ingot

Washington — Brass and aluminum foundries consumed 231,661 short tons of brass ingot in 1948, reports Bureau of Mines. Brass mills and wire mills used 4322 tons, bringing the combined total for the year to 235,983 tons. Ingot makers sold 302,910 tons of brass ingot in 1948 and, so far as can be determined, all of it went to the above mentioned group of consumers except for a few hundred tons that were exported. If the consumption of ingot by these plants was equal to their purchases, as is probable, the 235,983 tons reported as consumed accounts for 78 per cent of the 302,910-ton total. A total of 3433 foundries were canvassed on consumption of copper materials for the year 1948.

NONFERROUS METAL PRICES

(Cents per pound, carlots, except as otherwise noted)

Copper: Electrolytic 17.62½c, Conn. Valley, Lake, 17.75c, Conn. Valley.

Brass Ingot: 85-5-5-5 (No. 115) 15.00-16.00c; 88-10-2 (No. 215) 24.00c; 80-10-10 (No. 305) 20.50c; No. 1 yellow (No. 405) 12.75-13.75c.

Zinc: Prime western 10.00c, brass special 10.25c, intermediate 10.50c, East St. Louis; high grade 11.00c, delivered.

Lead: Common 14.80-14.92½c; chemical, 14.90c; corroding, 14.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.00c, pigs 16.00c. Base prices for 10,000 lb and over, f.o.b. shipping point.

Secondary Aluminum: Piston alloys 16.25-16.75c; No. 12 foundry alloy (No. 2 grade) 15.25-16.00c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 16.75-17.25c; grade 2, 15.50-16.25c grade 3, 14.50-15.25c; grade 4, 13.50-14.25c. Prices include freight at carload rate up to 75 cents per 100 lb.

5% titanium-aluminum alloy No. 1 (low Cu) 31.00c; No. 2 (2% Cu) 28.00c, f.o.b. Eddystone, Pa.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over, 20.50c, f.o.b. Freeport, Tex.

Tin: Grade A, 99.8% or higher (including Straits) $1.03; grade B, 99.8% or higher, not meeting specifications for grade A, with 0.05% max. arsenic, $1.028; grade C, 99.65-99.79%, incl., $1.024; 99.5-99.649% $1.024, grade F, 98-98.999% $1.015 for tin content. Prices are ex-dock, New York, in 5-ton lots.

Antimony: American 99-99.8% and over but not meeting specifications below, 38.50c; 99.8% and over (arsenic 0.05% max.; other impurities, 0.1% max.) 39.00c, f.o.b. Laredo, Tex., for bulk shipments.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 40.00c; 25-lb pigs, 42.50c; "XX" nickel shot, 43.50c; "F" nickel shot or ingots, for addition to cast iron, 40.50c. Prices include import duty.

Mercury: Open market, spot, New York $75-$78 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $24.50 per lb contained Be.

Cadmium: "Regular" straight or flat forms, $2 del.; special or patented shapes, $2.15.

Cobalt: 97-98%, $1.80 per lb for 550 lb (keg); $1.82 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 71.50c per ounce.

Platinum: $69-$72 per ounce.

Palladium, $24 per troy ounce.

Iridium: $100-$110 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 16-cent copper.)

Sheet: Copper 31.30; yellow brass 28.19; commercial bronze, 95%, 31.28; 90%, 30.84; red brass, 85%, 29.89; 80%, 29.47; best quality, 29.01; nickel silver, 18%, 41.78; phosphor-bronze, grade A, 5%, 50.47.

Rods: Copper, hot rolled 27.15; cold drawn 28.40; yellow brass free cutting, 22.76; commercial bronze, 95% 30.97; 90% 30.53; red brass 85% 29.58; 80% 29.16.

Seamless Tubing: Copper 31.34, yellow brass 31.20; commercial bronze 90% 33.50; red brass 85% 32.80; 80% 32.38.

Wire: Yellow brass 28.48; commercial bronze, 95% 31.57; 90% 31.13; red brass, 85% 30.18; 80% 29.76; best quality brass 29.30.

Copper Wire: Bare soft, f.o.b., eastern mills, 100,000 lb lots, 23.42½, l.c.l. 24.05, c.l. 23.55; weatherproof, f.o.b. eastern mills, 100,000 lb lots, 25.193, l.c.l. 25.943, c.l. 25.443; magnet, delivered, c.l. 27.62½, 15,000 lb or more 27.87½, l.c.l. 28.37½.

ALUMINUM

Sheets and Circles: 2s and 3S mill finish c.l

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	26.9	...	...
0.135-0.096	12-48	27.4	...	...
0.095-0.077	12-48	27.9	26.0	29.6
0.076-0.068	12-48	28.5	26.2	29.8
0.067-0.061	12-48	28.5	26.2	29.8
0.060-0.048	12-48	28.7	26.4	30.1
0.047-0.038	12-48	29.1	26.6	30.4
0.037-0.030	12-48	29.5	27.0	30.9
0.029-0.024	12-48	29.9	27.3	31.3
0.023-0.019	12-36	30.5	27.7	31.8
0.018-0.017	12-36	31.1	28.3	32.6
0.016-0.015	12-36	31.8	28.9	33.5
0.014	12-24	32.7	29.7	34.6
0.013-0.012	12-24	33.6	30.4	35.5
0.011	12.24	34.6	31.3	36.7
0.010-0.0095	12-24	35.6	32.3	38.0
0.009-0.0085	12-20	36.8	33.4	39.5
0.008-0.0075	12-20	38.1	34.6	41.1
0.007	12-18	39.5	35.9	42.9
0.006	12-18	41.0	37.2	47.0

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	—Hexagonal— R317-T4	—Hexagonal— 17S-T4
0.125	48.0	...	...
0.156-0.203	41.0	...	...
0.219-0.313	38.0	...	...
0.344	37.0	...	47.0
0.375	36.5	45.5	44.0
0.406	36.5	...	...
0.438	36.5	45.5	44.0
0.469	36.5	...	...
0.500	36.5	45.5	44.0
0.531	36.5	...	...
0.563	36.5	...	41.5
0.594	36.5	...	...
0.625	36.5	43.0	41.5
0.656	36.5	...	...
0.688	36.5	...	41.5
0.750-1.000	35.5	40.5	39.0
1.063	35.5	...	37.5
1.125-1.500	34.5	39.0	37.5
1.563	34.5	...	37.5
1.625	33.5	...	36.5
1.688-2.000	33.5	...	...
2.125-2.500	32.5	...	...
2.625-3.375	31.5	...	...

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more, $20.12½ per cwt; add 50c per cwt, 10 sq ft to 140 sq ft. Pipe: Full coils, $20.12½ per cwt. Traps and Bends: List price plus 55%.

ZINC

Sheets, 14.50c f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 14.00c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 13.00c; over 12-in., 14.00c.

NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 60.00c. Strip, cold-rolled 66.00c. Rods and shapes, 56.00c. Plates 58.00c. Seamless tubes, 89.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 47.00c; Strip, cold-rolled, 50.00c. Rods and shapes, 45.00c. Plates, 46.00c. Seamless tubes, 80.00c. Shot and blocks, 40.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.312 in. in diameter, less than 25 lb, 52.00-56.00c; 25 to 99 lb, 42.00-46.00; 100 lb to 4000 lb, 35.00-36.00c.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton, 27.00c.

Copper Anodes: Base, 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 27.96c; oval 27.46c; cast 25.99c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00, f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 250 lb, 25.25c; over 250 lb, 24.25c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 56.00c; 10,000 to 30,000 lb, 57.00c; 3000 to 10,000 lb, 58.00c; 500 to 3000 lb, 59.00c; 100 to 500 lb, 61.00c; under 10 lb, 64.00c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 26.50c; 400-lb bbl, 24.50c, f.o.b. Clevland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over, 119.00c; 500 to 999 lb, 119.50c; 200 to 499 lb, 120.00c; less than 2090 lb, 121.50c; ball, 1000 lb and over, 121.25c; 500 to 999 lb, 121.75c; 200 to 499 lb, 122.25; less than 200 lb, 123.75c f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers 71.8c; 100 or 300 lb drums only, 100 to 500 lb, 63.6c; 600 to 1900 lb, 61.2c; 2000 to 9900 lb, 59.4c, f.o.b. Sewaren, N. J. On 100 or 350 lb drums only, 100 to 600 lb, 63.3c; 700 to 1900 lb, 60.9c; 2000 to 9900 lb, 59.1c; 10,000 lb and over, 58.00c, f.o.b. Carteret, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100-lb drums 40.50c, f.o.b. Cleveland; 39.25c, Detroit; 39.25c, Philadelphia.

Stannous Sulphate: Less than 2000 lb in 100 lb kegs, 100.00c, in 400 lb bbl, 99.00c; more than 2000 lb, in 100 lb kegs, 99.00c, in 400 lb bbl, 98.00c, f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, 88.00c; 100 lb kegs, 89.00c, f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb f.o.b. shipping point.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	14.62½	14.62½	13.87½
Yellow brass	12.00	11.75	11.00
Commercial Bronze			
95%	13.62½	13.37½	12.87½
90%	13.50	13.25	12.75
Red Brass			
85%	13.25	13.00	13.12½
80%	13.00	12.75	12.25
Best Quality (71-80%)	12.87½	12.62½	12.12½
Muntz Metal	11.12½	10.87½	10.37½
Nickel, silver, 10%	14.00	13.75	7.00
Phos. bronze, A	16.37½	16.12½	15.12½
Naval brass	11.62½	11.37½	10.87½
Manganese bronze	11.62½	11.37½	10.75

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 13.75, No. 2 copper 12.75, light copper 11.75, composition red brass 11.00; radiators 8.75, heavy yellow brass 8.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 14.25, No. 2 copper 13.25, light copper 12.25, refinery brass (60% copper) per dry copper content 12.00.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and Brass: Heavy copper and wire No. 1 12.25-12.50, No. 2 11.25-11.50, light copper 10.00-10.50, No. 1 composition red brass 8.75-9.00, No. 1 composition turnings 8.50-8.75, mixed brass turnings 5.50-5.75, new brass clippings 10.00-10.50, No. 1 brass rod turnings 7.50-7.75, light brass 5.50-5.75, heavy yellow brass 6.00-6.25, new brass rods ends 7.50-7.75, auto radiators, unsweated 7.25-7.50, cocks and faucets, 7.25-7.50, brass pipe 7.75-8.00.

Lead: Heavy 11.25-11.75, battery plates 7.00-7.25, linotype and stereotype 11.75-12.00, electrotype 10.50-11.00, mixed babbitt 11-75-12.00, solder joints, 14.50-15.00.

Zinc: Old zinc 4.00-4.50, new die cast scrap 3.50-4.00, old die cast scrap 2.50.

Tin: No. 1 pewter 52.00-54.00, block tin pipe 70.00-72.00, No. 1 babbitt 40.00-42.00.

Aluminum: Clippings 2S 9.50-10.00, old sheets 5.50-6.00, crankcase 6.25-6.50,, borings and turnings 3.00-3.50, pistons, free of struts, 5.50-6.00.

DAILY PRICE RECORD

1949	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
July Avg.	17.279	13.335	9.346	103.000	17.000	38.500	40.000	71.500
June Avg.	16.606	11.850	9.548	103.000	17.000	38.500	40.000	71.500
May Avg.	18.045	13.566	11.880	103.000	17.000	38.500	40.000	71.500
Aug. 1	17.62½	14.30–14.35	10.00	103.00	17.00	38.50	40.00	71.50
Aug. 2-6	17.62½	14.55-14.60	10.00	103.00	17.00	38.50	40.00	71.50
Aug. 8-10	17.62½	14.80-14.97½	10.00	103.00	17.00	38.50	40.00	71.50
Aug. 11-17	17.62½	14.80	10.00	103.00	17.00	38.50	40.00	71.50
Aug. 18	17.62½	14.80–14.92½	10.00	103.00	17.00	38.50	40.00	71.50

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. E. St. Louis; Zinc, prime western, del. St. Louis; Tin, Straits, del. New York; Aluminum, primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt.	$23.00‡
No. 2 Heavy Melt.	21.00*
No. 1 Busheling	23.00‡
No. 1 Bundles	23.00‡
No. 2 Bundles	19.50-20.50*
No. 3 Bundles	18.50-19.00*
Heavy Turnings	18.50-19.00*
Machine Shop Turnings	15.50-16.00
Mixed Borings, Turnings	15.50-16.00
Short Shovel Turnings	17.50-18.00
Cast Iron Borings	17.00-17.50
Low Phos. Steel	25.00-25.50*

Cast Iron Grades

No. 1 Cupola Cast	28.00-30.00
No. 1 Machinery Cast	33.00-35.00
Charging Box Cast	29.00-29.50
Heavy Breakable Cast	26.00-27.00
Brake Shoe	29.50-30.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	24.50-25.00**
Axles	27.50-28.50
Rails, Random Length	26.50-27.50
Rails, 2 ft and under	32.00-33.00
Rails, 18 in. and under	33.00-34.00
Railroad Specialties	26.50-27.50
Angles, Splice Bars	26.00-27.00

‡Brokers paying up to $23 to cover last mill purchase at $21.
*Nominal.
**Brokers purchase prices.

CLEVELAND

No. 1 Heavy Melt. Steel	$20.00†
No. 2 Heavy Melt. Steel	19.00†
No. 1 Busheling	20.00†
No. 1 Bundles	20.00†
No. 2 Bundles	17.00†
Machine Shop Turnings	13.00†
Mixed Borings, Turnings	15.00-15.50
Short Shovel Turnings	15.00-15.50
Cast Iron Borings	15.00-15.50
Bar Crops and Plate	20.00-20.50†
Punchings & Plate Scrap	20.00-20.50†
Cut Structurals	21.00-22.00†

† Nominal.

Cast Iron Grades†

No. 1 Cupola	33.00-34.00
Charging Box Cast	28.00-29.00
Stove Plate	29.00-30.00
Heavy Breakable Cast	26.00-27.00
Unstripped Motor Blocks	24.50-25.50
Malleable	28.00-29.00
Brake Shoes	25.00-26.00
Clean Auto Cast	36.00-37.00
No. 1 Wheels	29.00-30.00
Burnt Cast	26.00-27.00

† Nominal.

Railroad Scrap

No. 1 R.R. Heavy Melt.	23.00-24.00
R.R. Malleable	28.00-29.00
Rail, 3 ft and under	36.00-37.00
Rails, Random Lengths	29.00-30.00
Cast Steel	25.00-25.50
Railroad Specialties	28.00-29.00
Uncut Tires	28.50-29.00
Angles, Splice Bars	31.50-32.00

VALLEY

No. 1 Heavy Melt. Steel	$23.50-24.00
No. 2 Heavy Melt. Steel	22.50-23.00
No. 1 Bundles	23.50-24.00
No. 2 Bundles	20.50-21.00
Machine Shop Turnings	14.50-15.00
Short Shovel Turnings	18.50-19.00
Cast Iron Borings	18.50-19.00
Low Phos.	23.50-24.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	24.00-24.50

MANSFIELD

Machine Shop Turnings	$13.00-14.00
Short Shovel Turnings	18.00-18.50

CINCINNATI

No. 1 Heavy Melt. Steel	$18.00
No. 2 Heavy Melt. Steel	17.00
No. 1 Busheling	17.00
No. 1 Bundles	18.00
No. 2 Bundles	16.00
Machine Shop Turnings	9.00
Mixed Borings, Turnings	9.00
Short Shovel Turnings	10.00
Cast Iron Borings	10.00

Cast Iron Grades

No. 1 Cupola Cast	36.50
Charging Box Cast	26.00
Heavy Breakable Cast	25.00
Stove Plate	21.00
Unstripped Motor Blocks	18.00
Brake Shoes	19.00
Clean Auto Cast	36.50
Drop Broken Cast	39.00

Railroad Scrap

No. 1 R.R. Heavy Melt	20.00
R.R. Malleable	25.00
Rails, Rerolling	28.00
Rails, Random Lengths	28.00
Rails, 18 in. and under	36.50

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	$13.50-14.00
No. 1 Bundles	16.50-17.00
No. 2 Bundles	13.00-13.50
No. 1 Busheling	16.50-17.00
Machine Shop Turnings	9.50-10.00
Mixed Borings, Turnings	9.50-10.00
Short Shovel Turnings	11.00-11.50
Cast Iron Borings	11.00-11.50
Punchings & Plate Scrap	16.50-17.00

Cast Iron Grades

No. 1 Cupola Cast	28.00-29.00
Heavy Breakable Cast	24.00-25.00
Clean Auto Cast	28.00-29.00

BUFFALO

No. 1 Heavy Melt. Steel	$24.00-24.50
No. 2 Heavy Melt. Steel	20.50-21.00
No. 1 Bushelings	20.50-21.00
No. 1 Bundles	20.50-21.00
No. 2 Bundles	18.50-19.00
Machine Shop Turnings	13.00-13.50
Mixed Borings, Turnings	15.00-15.50
Cast Iron Borings	15.00-15.50
Short Shovelings	16.00-16.50
Low Phos.	24.50-25.00

Cast Iron Grades

No. 1 Cupola	29.50-30.00
No. 1 Machinery	32.00-33.00
Mixed Yard	28.00-28.50
Malleable	28.00-30.00
Heavy Breakable	26.00-27.00

Railroad Scrap

Rails, 3 ft. and under	29.50-30.00
Scrap rails	28.50-29.00
Specialties	25.00-26.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$20.00-20.50
No. 2 Heavy Melt. Steel	18.50-19.00
No. 1 Busheling	18.50-19.00
No. 1 Bundles	20.00-20.50
No. 2 Bundles	17.50-18.00
Machine Shop Turnings	14.00-15.00
Short Shovel Turnings	17.00-18.00
Mixed Borings, Turnings	14.00-15.00
Bar Crop and Plate	24.00-25.00
Punchings & Plate Scrap	24.00-25.00
Cut Structurals	23.00-24.00
Elec. Furnace Bundles	20.00-20.50
Heavy Turnings	20.00-20.50
No. 1 Chemical Borings	19.00-19.50

Cast Iron Grades

No. 1 Cupola Cast	27.00-28.00
No. 1 Machinery Cast	30.00-31.00
Charging Box Cast	26.00-27.00
Heavy Breakable Cast	26.00-27.00
Unstripped Motor Blocks	22.00-23.00
Clean Auto Cast	30.00-31.00
No. 1 Wheels	30.00-31.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	$14.00-14.50
No. 2 Heavy Melt. Steel	13.00-13.50
No. 1 Busheling	12.00-12.50
No. 1 Bundles	13.00-13.50
No. 2 Bundles	12.00-12.50
No. 3 Bundles	nominal
Machine Shop Turnings	7.00-7.50
Mixed Borings, Turnings	7.00-7.50
Short Shovel Turnings	8.00-9.00
Punchings & Plate Scrap	17.00-18.00
Cut Structurals	17.00-18.00
Elec. Furnace Bundles	17.00

Cast Iron Grades

No. 1 Cupola Cast	23.00-24.00
No. 1 Machinery	24.00-25.00
Charging Box Cast	19.50-20.00
Heavy Breakable	19.50-20.00
Unstripped Motor Blocks	16.00-17.00
Malleable	20.00-21.00

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	$11.50
No. 2 Heavy Melt. Steel	10.50-11.00
No. 1 Bundles	11.50
No. 1 Busheling	10.50-11.00
Machine Shop Turnings	5.50-6.00
Mixed Borings, Turnings	4.50-5.00
Short Shovel Turnings	6.50-7.00
Bar Crops and Plate	12.50-13.50
Punchings & Plate Scrap	12.50-13.50
Chemical Borings	8.00-8.50

Cast Iron Grade

No. 1 Cupola Cast	23.00-24.00
Mixed Cast	21.00-22.00
Heavy Breakable Cast	16.00-17.00
Stove Plate	19.00-20.00
Unstripped Motor Blocks	17.00-18.00

CHICAGO

No. 1 Heavy Melt. Steel	$22.00-23.00
No. 2 Heavy Melt. Steel	20.00-21.00
No. 1 Bundles	22.00-23.00
No. 2 Bundles	19.00-20.00
No. 3 Bundles	17.00-18.00
Machine Shop Turnings	15.00-16.00
Mixed Borings, Turnings	16.00-17.00
Short Shovel Turnings	17.00-18.00
Cast Iron Borings	16.00-17.00
Bar Crops and Plate	27.50-28.50
Punchings	28.00-29.00
Elec. Furnace Bundles	25.00-26.00
Heavy Turnings	21.00-22.00
Cut Structurals	26.00-27.00

Cast Iron Grades

No. 1 Cupola Cast	38.00-40.00
Clean Auto Cast	38.00-40.00
No. 1 Wheels	32.00-33.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	25.00-26.00
Malleable	32.00-33.00
Rails, Rerolling	34.00-35.00
Rails, Random Lengths	31.00-32.00
Rails, 2 ft. and under	35.00-36.00
Rails, 18 in. and under	36.00-37.00
Railroad Specialties	29.00-30.00
Angles, Splice Bars	32.00-33.00

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No. 2 Heavy Melt. Steel	19.00-20.00
Machine Shop Turnings	13.00-14.00
Short Shovel Turnings	13.00-14.00

Cast Iron Grades

No. 1 Cupola Cast	32.00-34.00
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Heavy Breakable Cast	23.00-25.00
Brake Shoes	24.00-25.00
Clean Auto Cast	33.00-35.00
Burnt Cast	24.00-26.00

Railroad Scrap

R. R. Malleable	24.00-26.00
Rails, Rerolling	31.00-33.00
Rails, Random Lengths	27.00-28.00
Rails, 3 ft. and under	31.00-33.00
Uncut Tires	22.00-24.00
Angles, Splice Bars	28.00-30.00

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No. 1 Heavy Melt. Steel	$18.00
No. 2 Heavy Melt. Steel	18.00
No. 1 Busheling	18.00
No. 2 Bundles	16.00
Machine Shop Turnings	13.00
Mixed Borings, Turnings	15.00
Short Shovel Turnings	15.00
Cast Iron Borings	15.00
Bar Crops and Plate	23.50
Cut Structurals	23.00

Cast Iron Grades

No. 1 Cupola Cast	31.00-33.00
Stove Plate	27.00
No. 1 Wheels	17.00-18.00

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Rails 3 ft. and under	25.00-26.00
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No. 1 Heavy Melt. Steel	$17.00
No. 2 Heavy Melt. Steel	15.00
Nos. 1 & 2 Bundles	13.00

Cast Iron Grades

No. 1 Cupola Cast	23.00-25.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	17.00
Wheels	17.00
Rails, Random Lengths	17.00

SEATTLE

No. 1 Heavy Melt. Steel	$16.00
No. 2 Heavy Melt. Steel	16.00
No. 1 Bushelings	13.50
Nos. 1 & 2 Bundles	14.00
No. 3 Bundles	nom.
Machine Shop Turnings	11.00
Mixed Borings, Turnings	11.00
Punchings & Plate Scrap	22.00
Cut Structural	22.00
Elec. Furnace Bundles.	23.00

Cast Iron Grades

No. 1 Cupola Cast	20.00-22.00
Heavy Breakable Cast.	17.00
Stove Plate	17.00
Unstripped Motor Blocks	17.00
Malleable	20.00
Brake Shoes	23.00
Clean Auto Cast	23.00
No. 1 Wheels	22.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	17.00
Railroad Malleable	22.00
Rails, Random Lengths	17.00
Angles and Splice Bars	17.00

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(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$20.00
No. 2 Heavy Melt. Steel	18.00
Nos. 1 & 2 Bundles	16.00
No. 3 Bundles	nom.
Machine Shop Turnings	12.00
Mixed Borings, Turnings	12.00
Punchings & Plate Scrap	24.00
Electric Furnace Bundles	26.00

Cast Iron Grades

No. 1 Cupola Cast	27.50

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Rails, Rerolling	25.00

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(Delivered prices)

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No. 1 Bundles	20.00
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Mixed Steel Scrap	16.00
Mixed Borings, Turnings	14.00
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Rails, Rerolling	23.00
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Bushelings new factory, prep'd	18.00
Bushelings new factory, unprep'd	13.00
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Cast Iron Grades*

Cast	33.00-35.00

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LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Sheets Strip . . .

Supplies of principal flat-rolled products continue to tighten as auto needs remain high

Sheet Prices, Page 114

Philadelphia—Sheet producers generally are well booked for the remainder of the quarter on the major grades, with some now scheduled tightly throughout October on cold-rolled and galvanized sheets. Some hot-rolled is still available for delivery next month. One district mill, in fact, is able to ship on new orders by the middle of September.

Stainless and electrical sheets can be had within three to four weeks; enameling stock within five weeks from some suppliers.

Supplies of the principal flat-rolled items continue to tighten. Automotive requirements are still high while those from stove and drum manufacturers are maintaining an improved rate.

Peaceful settlement of the steel labor dispute might lead to substantial cutbacks, especially in automotive tonnage. Should the controversy be settled without strike, some market authorities believe business in general would be encouraged to go ahead to the extent that adjustments due to excess buying for protective purposes would be offset to a considerable degree. Nevertheless, it is conceded that automotive requirements, which for months past have been outstanding, likely will be smaller in the final quarter, and may leave a gap difficult to fill.

New York—Most sheet sellers are sold through October on cold-rolled and galvanized sheets although they are in better position on hot-rolled, enameling sheets and specialty grades. Hot-rolled sheets can be had for shipment in four to five weeks and enameling stock in some instances within four weeks. Stainless steel and electrical sheets are available within two or three weeks, although some sellers are quoting slightly more extended position. In general, demand is more active than a month ago, but whether the improvement is more than a flurry remains to be seen. Some buying over recent weeks undoubtedly has been as a hedge against possible labor trouble in the steel industry. Should labor contract negotiations be settled peacefully, there may not only be a decline in demand, but actual cutbacks where purchasers have been buying extra tonnages because of the possibility of a disruption to the flow of steel. The fact remains that much of the tonnage now being bought couldn't possibly be delivered before Sept. 15 strike deadline, as it is now set up. Hence, strike protection can't be too much of a factor at the moment.

Pittsburgh—Sellers report heavy pressure from automotive builders and parts suppliers to get out steel requirements for completion of 1948 models before threatened strike date around mid-September. Tight supply situation persists in cold-rolled sheets and galvanized stock. Slight improvement in demand was recorded through first half of this month from electrical appliance manufacturers, resulting in upturn in specifications for silicon sheets and strip as well as enameling stock. However, silicon sheets still are available within normal processing time. Deliveries on hot-rolled sheets and strip and cold-rolled strip also are available within 3 to 4 weeks. Sellers contend customers' inventories have in many instances reached level where new ordering soon will be necessary for replacement purposes. Portion of recent upturn in new orders is attributed to protective buying as a hedge against threatened steel strike next month.

Boston—Considerable number of sheet users are pressing for earlier delivery against old orders, but hedging operations in anticipation of production suspensions is not heavy. All tonnage wanted by early September can not be shipped; inventories in some instances are substantially lower and steel on hand would not carry consumers far with new supply halted.

Cold-rolled carbon and galvanized sheets are most extended of flat-rolled products. New buying of specialties is developing at a modest rate. Cold reduction mills now have a balanced supply of raw materials, permitting more flexibility in production, but demand is slow. Confusion as to cold strip pricing has not disappeared entirely. Bulk of low carbon is quoted 4.50c f.o.b. mill, but some volume sells on a Pittsburgh base while one producer quotes 4.50c f.o.b. mill Boston district and New Haven. Recent improvement in flat-rolled also includes some buying of tack plate.

Chicago—Upsurge in sheet specification is extending delivery dates further, a consequence of both protective buying and generally improved production schedules in a variety of consuming plants. One district mill finds that, while most major products are in better demand, the pressure is strongest for sheets; perhaps as much as 80 per cent of current ordering is for this product. Serving to augment demand beyond that attributable to inventory accumulation in preparation for a steel strike is the buying now being done for delivery as late as December. Arrearages with one mill average between two and three weeks' output, a fact which limits the amount of orders now taken from the automotive industry, the particular group appearing most anxious to do its heavy buying for delivery before Sept. 15. Better buying is noted from every major section of the household appliance field; kitchen cabinet makers, particularly, say outlook is vastly improved. At a seasonal production peak now are many toy makers, consuming a wide variety of steel products and components.

Cincinnati—Bookings of orders assure full rolling schedules in district sheet mills through September. There have been no cutbacks in automotive tonnage to lighten inventories which are heavy as a hedge against steelmakers' strike. Output of galvanized sheets continues under demand. The dull market for stainless and silicon sheets is showing no improvement.

Birmingham—Sheets and strip are in strong demand, the latter due largely in anticipation of the cotton season with ginning under way in some instances. Sheet output remains at virtual capacity, but, as has been the case for some years, is not sufficient to meet requirements of the trade territory.

Los Angeles—Demand for flat-rolled products continues strong, with some buying undoubtedly stemming from consumer concern over effects of a steel strike. At the same time, observers point out that many fabricators have worked their inventories down to a hand-to-mouth level, and are back in the market to fill normal needs. Light gage galvanized is in tight supply, with requirements of industry and agriculture remaining heavy. One fabricator here is setting up an operation which is new to Southern California—manufacture of galvanized granaries to be sold in knockdown form for use in the northwestern states.

St. Louis—Sheet demand is going up at a steeper rate than had been expected. Indications now are that many factories here over-did the job of slashing inventories during the first and second quarters and find themselves unable to operate at the desired rate during the present period. Improved outlook for the fourth quarter is now bringing in orders, both to replenish inventories and to get set for better fourth quarter business. There is considerable feeling sheet production and demand will be in balance the last quarter. Partly because of rising demand—plus completion of some mill repairs—ingot production rate jumped 14 points last week. Cold rolling lines are operating at 100 per cent of capacity after three months of intermittent mechanical trouble.

San Francisco—Although forward buying of flat-rolled steel items hasn't shown a pick-up, day-to-day demand is holding fairly steady and some seasonal pick-up may be forthcoming soon. Supplies generally are ample. Cold-rolled and galvanized sheets are in greatest demand, and their supply is relatively scarcer.

Wire . . .

Wire Prices, Page 115

Boston—Demand for wire entering into automobile production holds at a steady rate, but some slackening from that direction next quarter is expected. Consumers in that industry have been bulding inventory, contrary to trends in other directions. Bulk of buying is for prompt delivery which wire mills in general can meet, longer process items being exceptions. Mill backlogs are down due to the lack of forward buying. Where delivery can be met by early September, some miscellaneous deferred tonnage has been released in slightly better volume.

Birmingham—Wire product demand holds to the satisfactory rate evident for several months. Improvement in baling wire demand is noted along with a pick-up in demand for nails which went rather sour on the market a few weeks ago. Most jobbers are relatively well stocked on major items.

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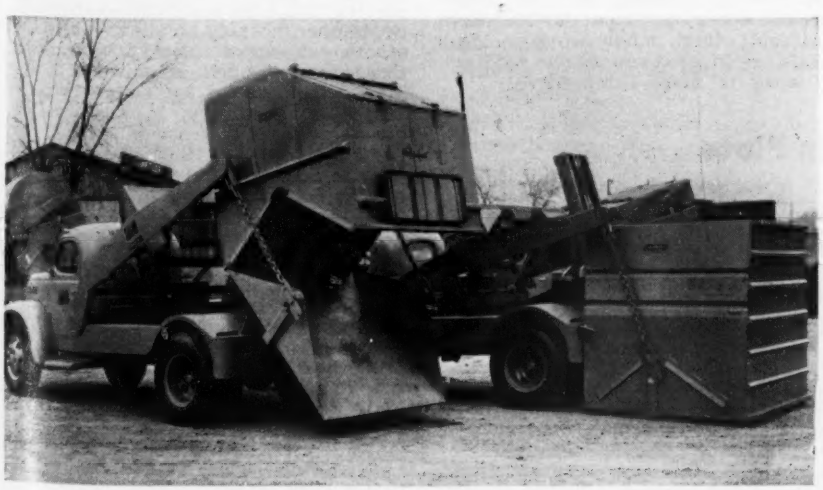

Photo above shows eleven hoisting units recently delivered to the U. S. Navy. Various types of containers are shown in carrying positions. Photo at left shows a hoisting unit preparing to lift a 10 cu. yd. Flat Top container, while another hoisting unit is dumping a 9 cu. yd. Trash and Rubbish Kolector type container. All controls of unit are conveniently located at the driver's seat. One driver and one truck handles any number of containers regardless of types.

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Structural Shapes . . .

Fabricators cut order backlogs further. Many now quote firm prices on new inquiries

Structural Shape Prices, Page 115

Pittsburgh — Structural fabricators continue to make headway against order backlogs which extend about six months depending on type of work, against 12 months and longer at this time last year. While off substantially from a year ago, trend in new inquiries appears to be leveling off at about 50 to 60 per cent of last year's volume. Relationship of the steel tonnage involved in public and private work remains unchanged with the former slightly greater. There is a growing tendency among fabricators to quote firm prices on new inquiries, reflecting increased competition. This practice is expected to become more widespread following determination of wage and raw material costs stemming from possible fourth round wage advance. Tight supply situation persists in wide flange beams with mill order backlogs extended 2 to 3 months in contrast with 4 to 6 weeks for standard shapes and plates. Threat of industry wide strike Sept. 15 has not prompted many fabricators to build up steel stocks.

New York—While there are fewer large tonnages being figured, volume in the local structural market is being fairly sustained by greater number of small inquiries. Demand is still predominately of public character, a situation that is expected to continue in probably increasing degree for a while. Fabricators report a further reduction in their backlogs, with shops having anywhere from two to four months work on hand.

Boston—An increase in bridge inquiry, notably from Connecticut and Maine, releases approximately 2500 tons for estimates, including a 1100-ton viaduct, Waterbury, Conn. Volume also includes substantial tonnage of steel grid flooring for repairs to the Massachusetts avenue bridge, Boston-Cambridge. Public work is slightly heavier, including schools, but private construction lags. Contract for superstructure, High bridge, Rumford, Me., has been placed, bids direct, at slightly better than $293 per ton, fabricated and erected.

Philadelphia—Due primarily to public work, demand for structural shapes is more active, with fabricators looking for the improvement to extend into early fall. Volume of new business is not yet sufficient to offset shrinkage in order backlogs at fabricating shops, but it has retarded the decline and so far this month business has been heavier than expected.

Shape supply is easy, with standard sections available within three to four weeks and wide flange sections within four to six weeks. The Leading eastern producer has resumed rolling standard shapes and bar angles at its Lackawanna, N. Y., mill after a period of several years.

The Kaiser-owned shape mill and bridge shop at Phoenixville, Pa., is being advertised for sale by the H. H. Buncher Co., Pittsburgh. While the shape mill has been down since last spring, the bridge shop has been operating and is understood still to have enough work on hand to carry it into October. Meanwhile, raw material inventories and surplus shapes are steadily being reduced through outside sales.

Chicago—Overconfidence in their ability to get material has caused embarrassment to some fabricators recently. While structurals have never became completely easy to obtain, the trend toward better supply was so marked until recently that promises were made which could not be kept. Shapes continue to be one of the scarce items at warehouses and mills, at least in certain specifications. Demand is picking up from projects which were deferred in expectation of lower steel prices but the number of these appears to be minor in comparison with the public works projects which are presently active. Backlogs vary with fabricators ranging from those largely nonexistent to those covering the rest of the year and beyond. Most active shops are those with large power plant and municipal projects, but small commercial and industrial jobs, of which there are a large number, are the backbone of business for a large segment of this industry.

San Francisco—The strike of truck drivers for many cement-mixing plants in the San Francisco area has brought a halt to a large number of heavy construction projects and demand for structurals has been curtailed sharply. However, signs of reviving interest in new building may bring a pick-up in buying this autumn.

Denver—Bureau of Reclamation announces award at $17,600 to Schmitt Steel Co., Portland, Oreg., for furnishing bulkhead gates and lifting beams for Hungry Horse dam, involving about 50 tons shapes. Bids have been called Sept. 8 as follows: Sch. No. 2757, six radial gate hoists and equipment for Winchester Waterway, Columbia Basin project; sch. No. 2759, 14 motor driven fans, grilles, filters, etc. for Coulee power plant.

Seattle—Fabricators report varied conditions in the industry; some need additional contracts, while others have fair backlogs. Considerable volume of new business is in prospect, many projects being on estimators' boards. Largest tonnages immediately pending include stop logs and other equipment for McNary dam and other public works. Materials are in good supply and bidding for work is more competitive.

Tin Plate . . .

Tin Plate Prices, Page 115

Pittsburgh—Mill shipments of tin plate are greater than anticipated following heavy releases from mill stocks by leading can companies prior to July 16 deadline. At least a portion of current demand is attributed to another labor crisis next month. Sellers report specifications for October delivery are developing in favorable volume, although trade authorities still predict fourth quarter demand and shipments will decline moderately. Mills are fully specified through third quarter.

Plates . . .

Production rises slightly although demand from principal users continues to lag

Plate Prices, Page 115

Philadelphia—Plate rollings are somewhat heavier, due largely to resumption of such operations at the mill of Lukens Steel Co., Coatesville, Pa., last week, following a suspension of several days. However, demand still lags, with the smaller mills unable to step up rollings for more than four days a week; some mills have rolling schedules for even fewer days. Only one eastern producer appears to be on a full weekly schedule. This interest is booked up for the remainder of this quarter on sheared plates, ascribed in part to its own requirements; on universal plate, it can do much better. Other district producers can make deliveries on sheared plate within two to three weeks.

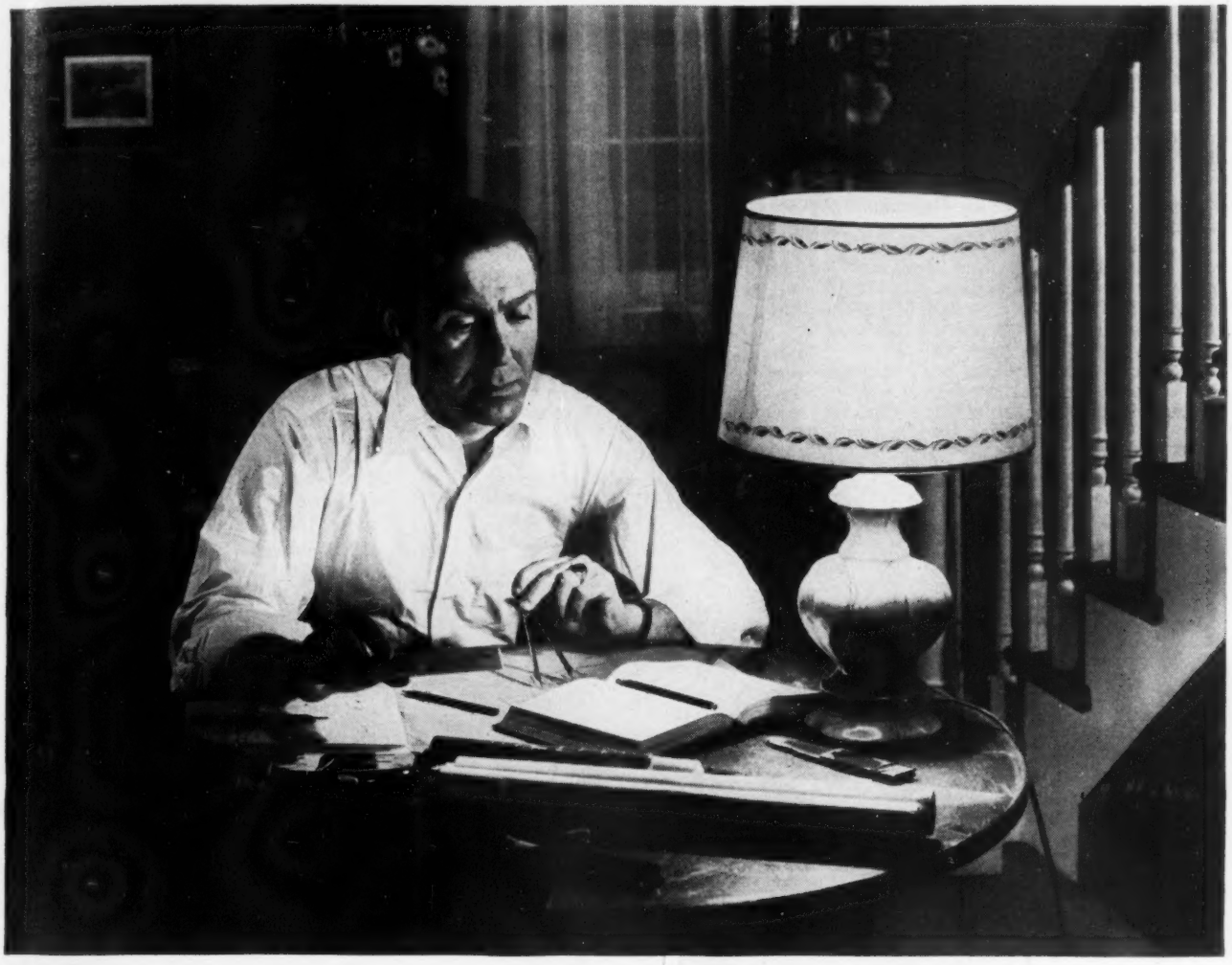
Dearth of demand for plates from the railroad and shipbuilding industries is seriously felt. One district yard, in addition to being confronted with cancellations for the construction of two Standard Oil Tankers, also lost out on the bidding for a new type of cargo ship for the maritime commission, the low bidder being the Ingalls Shipbuilding Co. of Alabama. The ship will require an estimated 5000 tons of steel, chiefly plates.

Building construction requirements of plates also are light, due primarily to a lag in oil and gas and power plant work. Utility engineers say there is a fairly substantial amount of power plant construction under design, but little pressure to go ahead with the work.

New York—Plate inquiry still lags, with little immediate improvement in prospect. Except on certain identified work there has been little effort to place orders as a hedge against a possible steel strike next month. Most sellers can make shipments within two or three weeks. Most buying at present involves miscellaneous specifications for tank and boiler shop work. Prices are unchanged.

Boston — Plate shops are buying sparingly, working off inventory and placing orders for prompt delivery to fill openings in stock. Only one mill serving this area is scheduled through September, notably on sheared plates; others can make delivery in two to three weeks. Lack of forward buying is emphasized by small volume placed for delivery in the fourth quarter. Slight increase in buying by the Navy is noted, bids closing Aug. 24 on approximately 3045 tons of marine boiler and medium-tensile hull steel grades for delivery to East and West Coast yards.

Birmingham — Plate production is substantially at capacity and remains on that schedule except for momentary flurries in other items which causes some ingot diversion. Steel mills are stocking no plates, even though the biggest usual users—car builders and ship builders—has tapered off considerably. Many miscellaneous users, who have had to dig hard for plates are faring somewhat better than usual.



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Steel Bars . . .

Deliveries of hot-rolled carbon bars gain as threat of strike increases

Bar Prices, Page 114

Boston—Until inventories are substantially lower in some instances, new buying of cold-finished carbon bars is likely to continue slow and spotty; several warehouses are also carrying rather heavy stocks of this grade. Alloy inventories are relatively lower than those of carbon and, while consumption is under that recorded earlier this year, bar tonnage is being fabricated at higher rate than volume going to mills. Orders placed as a hedge against possible mill strikes next month are nil in this district. Screw machine products plants are slightly more active.

New York—Bar inquiry is slightly more active, with deliveries now ranging three to four weeks in most instances. Certain mills can no longer do much under a month, especially in the small sizes. Whether there will be a further tightening depends much upon what happens in the steel labor contract dispute. Should a peaceful settlement be reached there may be some easing in deliveries as some consumers hold up after having overbought in an effort to protect themselves against a possible stoppage of shipments. However, such a settlement may so clarify the outlook as to actually stimulate demand still further in some directions.

Philadelphia — While hot carbon bar demand is spotty, tonnage is moving at a somewhat faster pace, with deliveries a shade more extended. Some producers claim they can now promise delivery a little under four weeks. Uncertainty as to the outcome of the labor controversy has added to buying volume, especially over the past 10 days or so. The temper of producers' testimony before the presidential board which began week before last has caused many consumers to revise their estimates as to chances of a peaceful settlement of the labor controversy. Whereas earlier they thought the dispute, in the end, would be terminated without a strike, many now regard that as being no more than a 50-50 possibility.

Pittsburgh—Merchant carbon bar interests state bookings this month have registered a slight improvement over the comparable July period. There is growing evidence that customers' inventories have been reduced to more realistic levels with result consumers have been forced to re-enter the market on a conservative basis for stock replacement purposes. Coldfinishers state that, despite excessive inventories still reported by some consumers, an up-turn in order volume has been noted in recent weeks. Sellers are more optimistic on near term outlook than was the case early this summer. However, production schedules probably will continue at reduced levels through remainder of this year. Trade authorities are unable to accurately determine what extent new order volume is influenced by strike threat of Sept. 15. Alloy bar demand is expected to record moderate improvement from oil well drilling industry in fourth quarter for such items as tool joints, drill rods, collars, etc.

Chicago—A spotty pickup in carbon and alloy bar demand has been noted locally. Aggregate inquiry is of such magnitude that one producer has brought an additional electric furnace into operation. Many specifications remain on the "easy-to-obtain" list although recent weeks have shown a moderate extension of delivery time for some items. Forgers' inventories are generally high and, with operations in many of these plants restricted by lack of new business or delay in receiving releases for present orders, bar demand from this direction is static. The important farm implement and heavy earthmoving machinery fields, however, are boosting their total demand; one implement company reveals that all but two plants in its nationwide network are scheduled for full operations into 1950. Cold-drawers' books are generally full for at least a month ahead, but spot openings sometime occur.

Los Angeles—Producers and jobbers report that bar requirements continue to stiffen, with improved demand for rounds, flats, bar-sized angles and shapes. Substantial progress apparently has been made by many users in working off inventories, particularly among suppliers to the farm implement and automotive industries.

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Reinforcing Bars . . .

Reinforcing Bar Prices, Page 114

Los Angeles—Although construction is increasing, and fabricators look for additional improvement in the fourth quarter, demand for reinforcing bars remains spotty. While several mills are finding it difficult to fill rolling schedules, another major producer here is operating at capacity.

San Francisco—Light buying continues, and supplies generally are in a surplus position. Production of bars has been cut back substantially.

Seattle—A steady influx of small tonnages is reported by rolling mills, minor construction and repair jobs absorbing a large amount of reinforcing bars. Larger shipments are going to public works projects. Backlogs indicate continued capacity operations to the end of the calender year.

Northwest Steel Rolling Mills Inc.'s plant, Seattle, is still idled while Bethlehem Pacific Coast Steel Corp.'s Seattle plant is operating at capacity.

Largest tonnage of reinforcing bars pending is 700 tons for Portland's treatment plant, unit of a $12 million project; low bid of $980,620 was entered by L. H. Hoffman, Portland, Oreg.

Semifinished Steel . . .

Semifinished Prices, Page 114

Pittsburgh—Sellers report moderate improvement in order volume for semifinished steel items. Supplies of semifinished exceed requirements of nonintegrated steel producers. Little, if any, activity is noted in the rerolling ingot market, while demand for sheet bars has receded to lowest level in the postwar period. Improvement in semifinished orders is restricted to forging quality billets, originating primarily from automotive trade.

Mill Equipment Orders Rise

Pittsburgh—Steel industry expansion programs in European countries account for a major portion of domestic steel mill equipment manufacturers' order backlogs, which in most instances show little change from near record level recorded this time last year. This is not necessarily true among all concerns although in general demand for mill facilities has held up much better than activity in most other industrial lines. The French "Sollac" expansion program amounting to $50 million and involving an 80-inch six stand hot-strip mill to United Engineering & Foundry Co., a 56-inch five stand cold reduction mill to Mesta Machine Co., $9.5 million of electrical equipment to Westinghouse Electric Co., plus usual complement of auxiliary facilities and Yugoslavia's $3 million steel mill to Continental Foundry & Machinery Co. are latest such foreign commitments placed with interests here.

Electric furnace builders also report commitments with foreign accounts with contracts for 4 additional units under negotiation.

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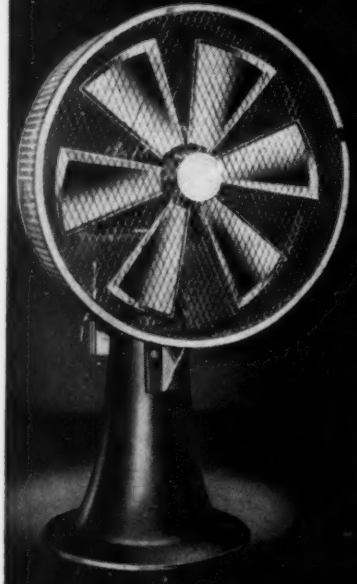

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Alloy Steel . . .

Cleveland—To help fill automotive company orders for alloy steel before date of a possible strike in the steel industry, Republic Steel Corp. put an additional open hearth and two electric furnaces into operation last week. The open hearth was added at Massillon, O., making six of the company's nine furnaces operating there. The two additional electric furnaces went on at Canton, O. Thus, nine of the company's 12 electrics are operating there, in addition to four of six open hearths.

Warehouse . . .

Warehouse Prices, Page 117

New York—Demand for steel from warehouse is improving slightly from the July low. With few exceptions, distributors are placing orders with mills in about the same volume as their sales; inventories are now well balanced and buying policies follow replacements needs. Warehouse sales record sheets covering recent years are hardly reliable for normal operations and more conservative buying is the general policy. Price-wise, merchant steel pipe is shaky, reflecting in part desire of more distributors to turn over pipe stocks since withdrawal of consigned stocks. Minor warehouse service extras are also being waived on some products.

Philadelphia—District warehouses have done relatively little excess buying as insurance against a steel strike. With business tapering and mill shipments good for some time past, they have been able to build up sizable inventories without special effort. Sales so far this month are at a rate perhaps a shade lower than that of last month. Little or no protective buying is being done by consumers because of the possibility of a walkout at the mills in September.

Cincinnati—A feature of the warehouse market is the slim flow of steel orders from coal mining interests. This condition is attributed only partly to the shortened work week in mines. Sales of building steel, on the other hand, are better as supplies come in balance to meet these demands promptly. Jobbers likely will show a gain in their business over the July volume; buying still consists of small orders to cover immediate needs.

Birmingham—Warehouse demand for steel inches gradually upward. Stocks in most instances are also increasing. Some items, notably galvanized sheets, are still on the scarce list. Some of the steady but not spectacular buying is attributed to the possibility of a strike in steel coupled with the complications still evident in the coal industry.

Los Angeles—Warehouse activity is fairly stable, holding at virtually the same level for the past 30 days. Jobber inventories are in somewhat better balance, although sheet supplies are tightening up. There is continued price-cutting on surplus stocks of items for which demand is slow. Sales of such surplus by jobbers at less than mill price generally are confined to other warehouses.

Seattle — Warehouse volume is about equal to that recorded in July, jobbing houses report. Demand con-

tinues fair and steady, all out-of-stock items moving out quickly. Galvanized sheets are the only critical item on the list and this bottleneck is expected to be eliminated within six weeks. Price schedules are unchanged. Complaint is heard over delayed shipments, said to be due to mills holding back until carload tonnages are available. This situation is disturbing to the trade.

Pig Iron . . .

Pig Iron Prices, Page 116

New York—Pig iron business here shows only slight improvement and most sellers look for little real gain over the next two or three weeks. Meanwhile, consumers are working off some of the higher priced inventories laid in earlier in the year and with any material pick-up in their own business would soon be active in the market again. Pig iron production at furnaces serving this area has shown little recent change, with a result that operations are still piling tonnage.

Boston—Pig iron shipments are slightly ahead of those reported last month, but buying is on a hand-to-mouth basis, including that by consumers who have worked down inventories. Melt remains at a sharply reduced level and most shops show no inclination to build up stocks. Inventories of finished castings, higher than estimated originally, are being reduced gradually, but volume of new orders reaching foundries is slow. Several furnaces have adjusted production closer to actual demand. Steelworks are operating at a lower rate than before vacation suspensions.

Philadelphia—Demand for foundry iron this month is at a slightly higher rate than that in July. High priced inventories are being worked off and, in some instances, casting requirements have picked up.

Inquiry for basic iron is quiet and, in general, there has been little overall improvement over recent weeks. Producers continue to pile iron. Many buyers look for a reduction in current pig iron prices, although they do not anticipate any change before adjustment of the steel labor dispute.

Pittsburgh—Demand for foundry iron has recorded little change at levels well below that recorded this time a year ago. New buying apparently is limited to actual requirements. However, heavy shipments from producers' stocks are again anticipated early in September as a hedge against possible industry-wide strike around Sept. 15. Jones & Laughlin Steel Corp. has taken its No. 1 blast furnace out of service at Aliquippa due to lack of orders, making a total of 14 out of 47 units idle in this district.

Buffalo—Opinions vary as to how much of a rebound will take place in pig iron demand. The Bond plant of the American Radiator & Standard Sanitary Corp., the world's largest producer of cast iron home heating furnaces, resumed operations last week, operating four days. The plant halted production on July 1.

Merchant iron sellers report occasional orders from foundries for immediate shipment, indicating that inventories are at a low point. On the other hand, some iron was still reported moving into warehouse depots. Pig iron operations held at 69 per cent of capacity, with one of the five idle stacks in the district expected to be relighted shortly.

Cincinnati — Pig iron orders for September delivery are modestly better, giving basis for belief that the low point in the foundry melt in this district has been passed. Expanded shipments could mean that inventories were worked off, but other reports indicate they reflect an increase in demand for castings now that the period of mass vacations is over and an expected seasonal improvement in some lines which recently have been dull. Betterment, as envisioned now, will be in both northern and southern iron.

Chicago—A number of foundries, which previously were consuming inventory, have increased their demands for merchant iron. Anticipation of a possible shut-off in supply next month, betterment of castings orders from some directions plus end of vacations at many plants have had an exemplary effect on demand. Strong cast scrap market is an added factor in the improvement, some of the disproportionate price spread between these partially interchangeable commodities having been eliminated. Inland Steel Co. stack, which was making spiegeleisen prior to the

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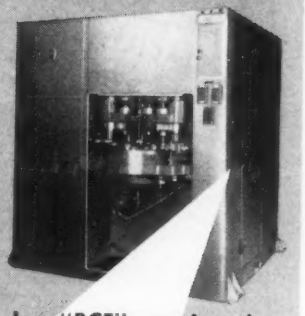

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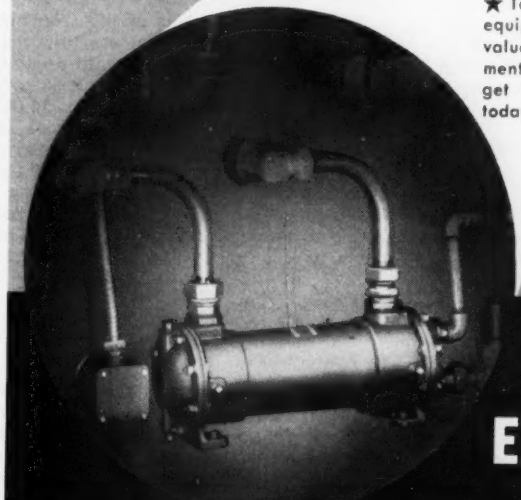

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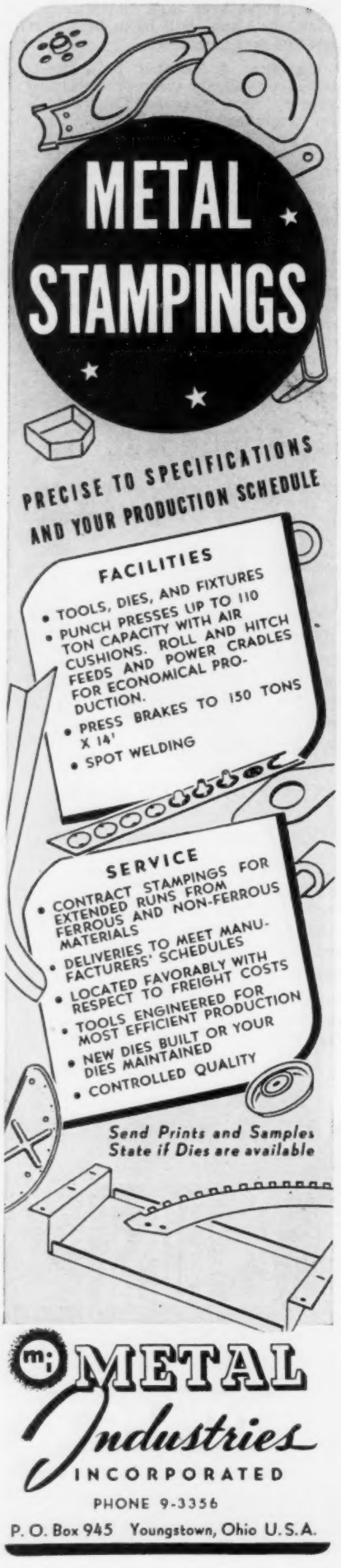
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threatened strike in July and which subsequently made basic to replace that lost when several furnaces were banked for a short period, has been switched over to a malleable iron campaign.

Birmingham — Pig iron demand builds gradually. While still considerably below the peak, need for iron is moderately better this far in August than it was a month ago, which adds up to gradual improvement since late May or early June as inventories have dwindled. Republic Steel Corp. has a furnace down for repairs which are proceeding satisfactorily. Tennessee Coal, Iron & Railroad Co. has a stack down at Ensley. Little stocking of merchant iron is evident.

Keokuk, Iowa—Current price quoted by Keokuk Electro-Metals Co., this city, for electric furnace silvery pig iron, open-hearth and foundry grades, 14.01-14.50 per cent silicon, is $77 per gross ton, Keokuk, Iowa, and Wenatchee, Wash., freight allowed to normal trade area. Price for 12½-pound piglets is $82 per gross ton, Keokuk, freight allowed to normal trade area.

St. Louis—The slight bulge in pig iron buying continues to increase. Makers are picking up a few orders and a number of regular customers are still to be heard from this month. If these ask for the anticipated tonnage to build overly low inventories, the inference will be that the business improvement in local heavy industry is of more substantial nature than hedging against a steel strike. There is increasing sentiment among iron producers and consumers that September, when industrial vacations are over, will show notable improvement in pig iron demand. Production here remains at around 60 per cent of capacity, which has lately proved ample to hold up ground stocks.

Dominion Shuts Down Stack

Montreal, Que.—Dominion Steel & Coal Corp. will shut down one of its big blast furnaces at Sydney, N. S., because of a swing back to normal demand for pig iron, C. M. Anson, general manager, says.

Sufficient quantities of pig iron and lack of business from sterling exchange countries are the main reasons for closing the furnace. Pig iron production has been dropped to 54,000 tons monthly. Dominion Steel & Coal Corp. has four blast furnaces with total rated capacity of 730,000 tons per year.

No reduction in pig iron output has been announced by any of the Ontario producers.

Iron Ore . . .

Iron Ore Prices, Page 116

Cleveland—Nearly 3 million more tons of Lake Superior iron ore were shipped from upper lake ports from the beginning of the season to Aug. 15 than were shipped during the like period a year ago. Total shipments to mid-August came to 51,258,380 tons compared with 48,309,432 tons during the like 1948 period, reports Lake Superior Iron Ore Association, this city. Shipments for the week ended on the same date were slightly smaller than the corresponding week a year ago, totaling 2,677,118 tons and 2,873,371 tons, respectively. Shipments for the week from United States ports alone totaled 2,594,885 tons, or at an average daily loading rate of 370,698 tons, compared with 2,858,746 tons, at a daily rate of 408,392 tons, a year ago.

Details of the report on shipments follow:

	—Week ended Aug. 15—	
U. S. Ports	**1949**	**1948**
Escanaba	150,657	126,586
Marquette	114,896	146,082
Ashland	156,620	132,475
Superior	883,524	1,127,177
Duluth	664,237	688,576
Two Harbors	624,951	637,856
U. S. Ports	2,594,885	2,858,746
Canadian Ports		
Michipicoten	18,207	14,625
Port Arthur	64,026	....
Canadian Ports Total	82,233	14,625
All Ports Total	2,677,118	2,873,371

	—Season to Aug. 15—	
U. S. Ports	**1949**	**1948**
Escanaba	2,589,930	2,755,905
Marquette	2,795,057	2,467,712
Ashland	3,201,087	3,203,434
Superior	19,199,424	17,836,608
Duluth	11,714,919	10,921,105
Two Harbors	10,887,662	10,623,433
U. S. Ports Total	50,388,079	47,808,197
Canadian Ports		
Michipicoten	323,670	284,518
Port Arthur	546,631	216,717
Canadian Ports Total	870,301	501,235
All Ports Total	51,258,380	48,309,432

Washington—Iron ore imports during the first four months of this year amounted to 1,704,637 tons, with more than 1 million tons coming from Chile. During the first four months of 1948, ore imports amounted to 1,386,456 tons. Iron ore exports during the first four months amounted to 393,741 tons, against 429,016 tons in the corresponding 1948 period. Most of the ore during the first four months of this year went to Japan, a total of 212,878 tons. In April alone, shipments to Japan amounted to 74,728 tons.

Cleveland — Ten vessels in the American Great Lakes ore fleet have been withdrawn from the ore trade since mid-June, leaving a total of 255 in that trade as of Aug. 15. Two were withdrawn in the month ended July 15 and eight in the month ended Aug. 15.

The ore fleet consists of the following:

	Trip Capacity	No. of Boats
Pittsburgh Steamship Co.	689,250	61
Interlake Steamship Co.	364,900	36
Hutchinson & Co.	282,950	32
Cleveland Cliffs Iron Co.	195,600	22
Great Lakes Steamship Co.	139,700	15
M. A. Hanna Co., agent	139,100	13
Bethlehem Transportation Corp.	126,900	12
Wilson Transit Co.	110,000	11
Reiss Steamship Co.	76,400	8
Tomlinson Fleet	79,300	8
Columbia Transportation Co.	78,500	9
Midland Steamship Co.	59,900	7
Jones & Laughlin Steel Corp.	43,000	4
Kinsman Transit Co.	39,100	5
Shenango Furnace Co.	36,000	3
Boland & Cornelius	33,300	4
Browning Steamship Co.	26,400	4
Ford Motor Co.	23,750	2
International Harvester Co.	22,300	2
Brown & Co.	21,400	3
Gartland Steamship Co.	22,700	3
Schneider Transportation Co.	11,800	2
Total	2,622,250	266

Scrap . . .

Prices advance in many districts despite light buying and large stock

Scrap Prices, Page 120

Philadelphia — Steel scrap prices are sharply higher throughout most of the list here. Based on light trading, No. 1 heavy melting steel is now holding at $20-$20.50, delivered; No. 2 heavy melting and No. 1 bushheling, $18.50-$19; No. 1 bundles, $20-$20.50; No. 2 bundles, $17.50-$18.

Despite substantial increases, consumers are moving rather cautiously. They believe that while it might be well to lay in some tonnage at this time as the market appears to have taken a definite turn, they do not anticipate any succession of sharp increases. Most of them, as well as dealers, have substantial stocks on hand. Dealers in the nearby vicinity are estimated to have anywhere from 150,000 to 200,000 tons in their yards, most of it prepared. At the same time, higher prices and somewhat cooler weather are expected to stimulate collections. Consequently, consumers are moving slowly with the idea that somewhere along the line there will be sufficient tonnage offered a little later to check any runaway tendency.

Machine shop and mixed borings and turnings have advanced to $14-$15; short shovel turnings, to $17-$18. Changes in low phos scrap are nominal, with little new buying at the moment but with sentiment definitely stronger and dealers holding at higher levels. Bar crop and plate and punchings and plate scrap are currently available at around $24-$25; cut structurals at $23-$24. Electric furnace bundles and heavy turnings are $20.00-$20.50; No. 1 chemical borings, $19-$19.50.

Cast grades show continued strength, with demand more active. No. 1 cupola cast is higher at $27.00-$28.00, delivered; No. 1 machinery cast $30-$31; charging box and heavy breakable cast, $26-$27. Unstripped motor blocks are holding at $22-$23; clean auto cast and No. 1 wheels, $30-$31.

Boston—Higher prices for steelmaking scrap are not based on heavier buying in this area, but rather improved tone at larger consuming points. After extending normal vacation periods from two weeks to four in some instances, all district steel producers have resumed ingot production but at lower rate. They are well fixed for scrap. Foundry demand is light since most of the larger consumers have substantial inventories of high cost scrap. Yards are receiving only a light volume of material, but most of them are buying what is offered, taking the position that tonnage at current low prices is a bargain for future resale.

New York—Scrap brokers have again advanced buying prices on No. 1 and No. 2 heavy melting steel. They are now offering $14-$14.50 and $13-$13.50, respectively, on these two grades.

One consumer purchase of No. 2 heavy melting steel is reported to have been made at as high as $20.50,

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delivered. No change has been made in buying prices on No. 1 busheling and No. 1 bundles, but offerings on No. 2 bundles have been stepped up $1 a ton to $12-$12.50, f.o.b. shipping point.

Brokers are now offering $7-$7.50 on machine shop turnings and mixed borings and turnings, $8-$9 on short shovel turnings, $17-$18 on punchings and plate scrap and cut structurals. Brokers buying prices on No. 1 cupola have been stepped up to $23-$24, f.o.b. shipping point, on No. 1 machinery to $24-$25 and on charging box and heavy breakable to $19.50-$20. Unstripped motor blocks are higher at $16-$17 and malleable is at $20-$21.

Pittsburgh — Brokers and dealers contend that advance in quotations in other districts makes it impossible to obtain scrap from remote points for shipment here at $21 level for industrial No. 1. These interests have been forced to pay up to $23 to fill last mill orders of $21. Sizable tonnage also has been purchased at these higher prices on speculation that the next large mill purchases will be around $25. A growing number of dealers are refusing to sell what little processed scrap they have because of the same conviction that a reversal in price trend is under way. Metalworking companies also are shopping around prior to selling their scrap, although in many instances limited storage facilities restrict such efforts.

Advance in freight rates Sept. 1 also will increase pressure for higher prices. Some major scrap consumers state they would not be able to purchase large tonnages of No. 1 under current market conditions at $21. While there were no mill purchases last week, trade authorities generally agree $23 level is more representative of present market than last purchase price of $21.

Future scrap price trend is basically dependent on rate of ingot operations over coming months. Mill stocks are more than ample in many instances to permit staying out of market for dealer scrap until the labor situation is clarified. Anticipated easing in steel order volume throughout winter months is also major factor. However, if another inflationary spiral gets under way as result of steelworkers winning a substantial wage increase, it is held probable scrap prices will move upward in line with other basic raw materials.

Chicago—Scramble between brokers and dealers to get scrap, some to use in covering old orders, some to hold for speculative purposes, continued last week. Mill buying was limited to a few users. A sizable purchase of No. 1 heavy melting scrap was reported at $23, establishing a new price which is still subject to intense upward pressure in view of the bullish sentiment throughout the trade. Several quoted items, while as yet without consuming buyers, are sentimentally stronger. Machinery cast, now quoted at $38-$40, has brought an even higher price but tonnage bought above this spread has been relatively insignificant.

Cleveland—Scrap price quotations here are up, mainly on the basis of prices brokers say they are offering in an effort to get tonnage with which to cover old orders. The little buying that steel mills are doing is reported to be secret in most cases, but it is said this new buying shows a tendency to support the higher prices brokers are offering for material to cover old orders.

Some members of the trade expect no strike in the steel industry and foresee continued good operations that will lend strength to the scrap market.

Demand for foundry grades of scrap is reported somewhat increased.

Buffalo—Although volume of scrap material changing hands is small, stronger tendencies are apparent in the market here. Dealers and consumers are having difficulty getting together on prices. Dealers obviously are playing the increase in the local ingot rate for higher prices.

Price range spreads, in many instances considered nominal, are running as much as $2 on an item. No. 2 heavy melting and related items are up 50 cents to $20.50-$21, while No. 1 material remains at $24-$24.50. An early sale at a shade below the range was reported, but later dealers were refusing to accept additional No. 1 orders below $25.

Cast items also maintain strength. Sales of No. 1 cupola are reported within a range $29.50-$30, the outside figure being considered the market. No. 1 machinery is quoted at $32-$33.

Water borne scrap arrivals last week included two canal fleets with 7000 tons for the Bethlehem Steel Co.'s plant. The *S.S. Venus* pulled in from the upper lakes with 5000 tons.

Detroit—Scrap market continues strong, although no mill buying can be ascertained to support the rising price level. No. 1 and No. 2 bundles are up $1 per ton, along with No. 2 heavy melting, No. 1 busheling and plate scrap. Exceptional push is being given cast grades, all of which are up another $3 per ton. Ford is reported ready to buy a substantial tonnage of cast material and this is buoying the market generally.

Cincinnati—Scrap prices are higher, biggest advances being in cast grades. At the same time most open-hearth grades are unchanged and nominal on a lack of mill buying. Spotty purchases and effect of developments in other districts give an optimistic undertone to the market. Many market interests believe quotations sank too far during the downtrend earlier in the year. Hence, dealers are holding back tonnage on speculation. No. 1 cupola cast is the star performer in the current rise, with a markup to $36.50 on basis of purchases.

Birmingham—A distinct recovery trend is evident in scrap as prices move moderately upward, especially in some cast grades. Heavy melting, is showing gradual improvement, both in price and in demand, but most observers do not anticipate any runaway market in the offing.

St. Louis—Scarcities in virtually all scrap grades continue to boost prices. Low figures paid country collectors, high labor costs and freight rates have trimmed country shipments virtually to the vanishing point. The dealer scrap shortage has

turned emphasis to railroad scrap which in turn is getting more and more scarce as the roads economize on new steel purchases and reduce maintenance and dismantling programs. Partly because of small rail scrap offering, one big user here has cut off all but one of 10 furnaces. Cast grades have been boosted by the simultaneous re-entry into the market of foundries under sudden pressure by the auto industry to rush delivery of parts before the Ford dispute can set off other motor strikes. Foundry orders generally, have not jumped to a volume warranting the advance in cast grade prices; certainly they haven't picked up in proportion to prices. Many foundries merely held out for lower scrap prices until inventories hurt operations, then began buying at the same time.

Considerable confusion exists in the scrap market, but many brokers are convinced this is not an enduring price rise. The fact that one big mill hasn't yet bought for August, and another is refusing—at least temporarily—to pay more than July's $18 for melting steel, indicates that important consumers feel the same way. Practically no new orders for Nos. 1 and 2 steel are being placed in this district, and some brokers are reported paying $19 to $20 to fill orders contracted last month at $18. Poor shipments prevented earlier fillings.

Los Angeles—Movement of scrap is slow, with mills buying only limited tonnages. Despite the fact demand is sluggish, the price structure is unchanged. Dealers here are concerned over the effect of the latest freight increase on their rapidly narrowing profit margin. Contrary to usual practice, railroad scrap currently is bringing no premium. Demand likewise is slack for plate scrap, with electric furnace operations in foundries at low ebb. Iron foundries are buying only little scrap, but posted prices for No. 1 cupola cast are unchanged.

Seattle—Receipts of steel scrap are slightly under consumption so that inventories are being reduced. From a mill standpoint, the situation is greatly improved over six months ago when supplies were below requirements. The market is steady now at $16 for No. 1 and No. 2 heavy melting. Demand is slow for electric furnace items and cast iron scrap as foundry activity has declined.

San Francisco—Reduced ingot production in this area has dried up demand for domestic scrap. Mills are well stocked and are buying only enough to keep inventories on an even level.

Tubular Goods . . .

Tubular Goods Prices, Page 115

Los Angeles—Requirements for residential construction are maintaining strong demand for pipe in diameters under 2 in. Larger sizes are moving more slowly, with principal needs those of the oil industry. Expansion and improvement programs in that industry continue. Latest project announced is a $300,000 ocean tanker and tank-truck gasoline terminal to

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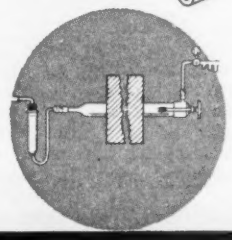

McDanel Porcelain Combustion Tubes and Zirco Tubes are precision made. Density, bore size, wall thickness, etc. are carefully controlled to assure maximum resistance to thermal shock, accurate fit and gas tightness. Cast as a single unit, they defy devitrification—give longer service and lower replacement costs. For carbon and sulphur determinations, McDanel Tubes are *tops*.

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be built at Carpinteria, Calif., by Standard Oil Co. of California.

Seattle—Demand for cast iron tubular goods is slow and little interest is being indicated. In most instances, bid calls include alternatives. No large projects are up for immediate consideration.

Zinc Consumption Drops

Washington—Consumption of slab zinc in the United States in May declined 3 per cent below the April total, was 10 per cent below the 1949 monthly average and was the lowest monthly rate since February, 1946, according to the Bureau of Mines. Consumers' stocks were 16 per cent below inventories on Apr. 30 as all industry groups reported substantial stock declines.

Smelter stocks of slab zinc were 75,830 tons on May 31 compared to 50,982 tons on hand May 1. Inventories of zinc dust at producers' plants continued downward and on May 31 were 8 per cent less than at the beginning of the month.

Shipments of zinc dust increased 26 per cent over April, whereas slab zinc shipments from smelters were 1 per cent below the April total.

Receipts of slab zinc at consumers' plants totaled 36,261 tons or 8 per cent less than in April. Gains in receipts of 5 and 10 per cent at galvanizing and die casting plants, respectively, were more than offset by losses of 63 and 37 per cent in zinc receipts at brass and rolling mills.

Secondary slab zinc production at 10 operating secondary redistillation plants totaled 2265 tons, including 472 tons of intermediate, 437 tons of brass special and 1356 tons of prime western. Production of intermediate and prime western grades increased but output of brass special grade declined.

In addition to stocks held at producers' and consumers' plants, 4493 tons of slab zinc were in transit to consumers compared to 4893 tons on Apr. 30.

Imports of zinc in ore in May were 21,336 tons compared to 25,485 tons in April. Slab zinc imports of 7272 tons were entirely from Canada. Slab zinc exports of 6205 tons in May were shipped mainly to United Kingdom and India. Of the total exported, 46 per cent was in the form of Prime Western grade and 36 per cent was regular high grade.

Rails, Cars . . .

Track Material Prices, Page 115

Chicago—Railroads' steel buying contracted further last week when one canceled some of its third quarter order for rails and fastenings and all of its fourth quarter commitment with a local mill. Another road has deferred until 1950 the tonnage it was planning to get in this year's final quarter.

Pittsburgh—Lack of freight car orders is expected to force some independent shops to close by late next month. Independent car builders are hopeful railroads' strict ordering policy will be revised in closing months of this year. However, there are no indications of a reversal in carriers' buying policy at this time. Manufacturers of car wheels report order backlogs are extended about three months, in sharp contrast to the very tight delivery situation a year ago. Similarly there are plenty of openings in rail mills' fourth quarter production schedules reflecting large rail cancellations over recent months.

Freight Car Awards

	†**1949	*1948	*1947	*1946	1945
Jan.	1,663	8,613	9,222	1,481	7,200
Feb.	332	10,698	13,724	2,328	1,750
Mar.	219	13,227	12,048	4,512	2,500
Apr.	30	17,215	9,186	3,564	1,120
May	589	2,228	7,389	2,900	1,526
June	153	5,368	12,784	3,335	670
July	408	11,308	14,840	14,836	3,500
Aug.	....	3,638	2,352	9,527	7,240
Sept.	....	738	9,917	11,102	12,840
Oct.	....	10,931	17,737	3,407	1,320
Nov.	....	4,852	8,079	7,190	1,650
Dec.	....	8,368	4,030	3,011	4,116
Total	....	97,184	121,308	67,193	45,432

* American Railway Car Institute.
† Preliminary.

Foundry Technical Group Named

FOUNDRY Industry Advisory Committee of the Munitions Board announces the appointment of a technical subcommittee. Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va., is chairman of the subcommittee and Lt. Col. F. H. Holmes, U.S. Air Force, is the Munitions Board liaison officer.

Other members are: George J. Behrendt, Eastern Malleable Iron Co., Naugatuck, Conn.; Charles W. Briggs, Steel Founders' Society of America, Cleveland; Charles O. Burgess, Gray Iron Founders' Society, Cleveland; Thomas E. Egan, Cooper-Bessemer Corp., Grove City, Pa.; Walter W. Edens, Badger Brass & Aluminum Foundry, Milwaukee; Richard A. Flinn Jr., American Brake Shoe Co., Mahwah, N. J.; Roy A. Gezelius, General Steel Castings Corp., Eddystone, Pa.; John W. Juppenlatz, Lebanon Steel Foundry, Lebanon, Pa.; James H. Lansing, Malleable Founders' Society, Cleveland; Carl F. Lauenstein, Link-Belt Co., Indianapolis; G. A. Lilliequist, American Steel Foundries, East Chicago, Ind.; S. C. Massari, American Foundrymen's Society, Chicago; Charles E. Nelson, Dow Chemical Co., Midland, Mich.; Donald J. Reese, International Nickel Co., New York; John S. Roberts, American Manganese Bronze Co., Philadelphia; Howard J. Rowe, Aluminum Co. of America, Pittsburgh; Harry M. St. John, Crane Co., Chicago; A. E. Shuh, U.S. Pipe & Foundry Co., Burlington, N. J.; Gosta Vennerholm, Ford Motor Co., Dearborn, Mich.; R. E. Ward, Bendix Aviation Corp., Teterboro, N. J.

Canada . . .

Toronto, Ont.—Primary iron and steel shapes produced in Canada during April totaled 331,688 net tons compared with 354,527 tons for March and 318,594 tons for April, 1948. Production for April this year

included 322,452 tons of carbon steel shapes and 9232 tons of alloy steel shapes.

Shipments for sale of primary iron and steel shapes in April amounted to 248,165 tons of which 239,772 tons were carbon and 8393 tons alloy steel shapes; for March, shipments totaled 262,408 tons, including 250,279 tons of carbon and 12,235 tons of alloy shapes; for April, 1948, shipments amounted to 220,508 tons, including 206,875 tons of carbon and 13,633 tons of alloy steel shapes.

Primary iron and steel shapes shipped for sale in April included these tonnages: 13,375 semifinished shapes, 16,188 structurals, 16,450 plates, 39,912 rails, 9795 tie plates and track material, 47,868 hot-rolled bars, 17,699 pipes and tubes, 25,795 wire rods, 26,737 black sheets, 7818 galvanized sheets, 9129 castings, 3763 miscellaneous hot-rolled products and 20,636 all other products.

Of the amounts shipped for sale in April, 50,393 tons went directly to railways and railway car shops; 12,597, to pressing, stamping and forming companies; 31,159, to merchant trade products; 32,617, to building construction; 20,274, to the containers industry; 8522, to agricultural equipment; 12,410, to the automotive industry; 9417, to machinery plants; 1712, to shipbuilding; 5993, to mining lumbering, etc.; 2322, to miscellaneous industries. Wholesalers and warehousing accounted for 28,497 tons and exports for 32,252 tons.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4100 tons, 1500-foot state viaduct and approaches for the Bronx River Parkway, New York, through Cayuga Foundation Corp., to Harris Structural Steel Co., that city.

1950 tons, state bridge, Ocean county, New Jersey, to Bethlehem Steel Co., Bethlehem, Pa.

1100 tons, 15-story apartment, East 54th St. and Lexington Ave., New York, through Campagna Construction Co., to Harris Structural Steel Co., that city.

800 tons, Pennsylvania Turnpike sections 25-C and 26-A, Lancaster county, to Bethlehem Steel Co., Bethlehem, Pa.

250 tons, state highway bridge, Route 229, Snyder county, Pennsylvania, to Bethlehem Steel Co., Bethlehem, Pa.

180 tons, steel superstructure, high bridge, Rumford, Me., to American Bridge Co., Pittsburgh, $52,899.40; bids Aug. 10, Augusta; Bethlehem Steel Co., Bethlehem, Pa., second low, $61,929.50; Phoenix Bridge Corp., Phoenixville, Pa., $64,380.50.

120 tons, nurses home, Elizabethtown, Pa., to Goetze Welding Co., Harrisburg, Pa.

100 tons, state highway bridge, Clearfield county, to Bethlehem Steel Co., Bethlehem, Pa.

STRUCTURAL STEEL PENDING

1100 tons, viaduct and approaches on Waterbury expressway, U. S. Route 6-A, total 446 linear feet, Waterbury, Conn.; bids Aug. 29, State Highway Department, Hartford.

1000 tons or more, wheel assemblies, lifting beams, dogging devices for McNary dam, Oregon; Willamette Iron & Steel Corp., Portland, low, $396,733.

1000 tons, station, Supplee-Wills-Jones Milk Co., Philadelphia; bids Sept. 7.

730 tons, Dollar Savings Bank addition, Fordham Rd. and Grand Concourse, Bronx, New York; bids in.

500 tons, home and hospital, Daughters of Jacob, New York; bids Sept. 6.

Unstated tonnage, St. Francis Hospital, Poughkeepsie, N. Y.; bids Aug. 25.

500 tons, shelter shed, Pennsylvania Railroad, Philadelphia; bids in.

200 tons, three state bridges, Glastonbury, Thompson and New Haven-West Haven, Conn.; bids in to State Highway Department, Hartford.

200 tons, Allentown bridge, King county, Washington; bids in.

185 tons, underpass, route 4 parkway, section 2-A, Woodbridge, N. J.; bids in to state highway department, Trenton, Aug. 18; also 72 tons concrete reinforcing bars.

180 tons, consolidated colored school, Bel Air, Md.; general contract to a Baltimore interest.

175 tons, small state bridges, Burnham, Harrison and Hermon, Me.; largest at Burnham, 100 tons; bids Aug. 24, Augusta.

110 tons, three-span composite deck bridge, Naugatuck river, South Leonard street, Waterbury, Conn.; bids Aug. 29, State Highway Department, Hartford.

Unstated, radial gates, hoists, etc., Winchester waterway, Columbia Basin project; bids to Bureau of Reclamation, Denver, Sept. 8; sch. No. 2757.

REINFORCING BARS . . .

REINFORCING BARS PLACED

250 tons, Queen Vista apartment house, Seattle, to Bethlehem Pacific Coast Steel Corp., Seattle.

200 tons, pump station and other projects, Spokane, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle; Henry George, Spokane, general contractor.

115 tons, Simalkamen bridge, Washington state project, to Bethlehem Pacific Coast Steel Corp., Seattle; Roy L. Bair, Spokane, general contractor.

REINFORCING BARS PENDING

700 tons, treatment plant, Portland, Oreg.; L. H. Hoffman, Portland, low, $980,620.

100 tons, including track rails and other items, tower footings and switchyard extension, Grand Coulee project; Pfeiffer & Hohner, Spokane, Wash., apparently low, $81,304.

Unstated, state overpass Gallatin county; bids to Helena, Mont., Sept. 22.

PLATES . . .

PLATES PLACED

1484 tons, procurement office, Chicago, Corps of Engineers, to Carnegie-Illinois Steel Corp., Pittsburgh.

100 tons, estimated, 40 welded steel dredge pontoons, Army Engineers, Memphis, to Avondale Marine Ways, Westwego, La., $135,480.

PLATES PENDING

3045 tons, marine boiler and medium tensile hull steel, east and west yards, U. S. Navy, main purchasing office, Washington; bids Aug. 24; inv. 1631 and 1632.

PIPE . . .

CAST IRON PIPE PLACED

500 tons, 3 and 5 inch, city irrigation system, Yakima, Wash., to American Cast Iron Pipe Co., Seattle.

500 tons, 4, 6 and 8 inch., city irrigation system, Yakima, Wash., to Pacific States Cast Iron Pipe Co., Provo, Utah.

STEEL PIPE PLACED

Unstated, 10,170 feet 10, 12, 14 and 16 inch, city irrigation system, Yakima, Wash., to Armco Metals Products Co., Portland, Oreg.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Norfolk & Western, coal-burning, steam turbine electric drive locomotive, to Baldwin Locomotive Works, Eddystone, Pa., in collaboration with Westinghouse Electric Co., Pittsburgh, and Babcock & Wilcox Co., New York. The engine, said to be a new type, is designed for freight operation and is rated at 4500 horsepower.

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CONSTRUCTION AND ENTERPRISE

FLORIDA

TAMPA, FLA.—Florida Power Corp., 101 Fifth St., St. Petersburg, Fla., has awarded a $500,000 contract to Kuljiam Corp., 1220 N. Broad St., Philadelphia.

GEORGIA

ATLANTA—National Cash Register Co. will soon release plans for bids for office building; A. Thomas Bradbury, architect, Ralph E. Slay, 60 Fifth St. N.E., Atlanta, associate architect.

DOUGLASVILLE, GA.—Douglas County Electric Membership Corp. will receive bids Aug. 30 for headquarters building; Southern Engineering Co., 699 Spring St. N. W., Atlanta, engineer.

IDAHO

POCATELLO, IDAHO—Pacific Fruit Express Co., Boise, Idaho, has awarded a $1 million contract to Morrison-Knudsen Co. Inc., 319 Broadway, Boise, for construction of a repair shop.

ILLINOIS

CHICAGO—Bowman Dairy Co., 416 N. Whipple, has awarded a $150,000 contract to Carroll Construction Co., 333 N. Michigan St., for construction of a factory; Leon E. Stanhope, 800 Davis St., Evanston, Ill., architect.

CHICAGO—Frigid Fluid Co., Grand Ave., Jefferson & Des Plaines Sts., has awarded a $200,000 contract to Kinnare Corp., 2816 W. Monroe St., for construction of a factory.

CHICAGO—Renard Linoleum & Rug Co., 2815 W. 31st St., has awarded a $400,000 contract for a warehouse to Poirot Construction Co., 2011 W. Pershing St.; Epstein & Sons Co., 2011 W. Pershing St., architect.

CHICAGO—Swift & Co., Union Stockyards, has awarded a $290,000 contract to R. W. Bateman Construction Co., 6225 N. Hermitage St., for construction of a plant.

KANKAKEE, ILL.—Kankakee Journal, 195 N. Schyler Ave., Leslie C. Small, will let a contract for $1,320,000, for a plant; Philip D. West, 185 N. Wabash, architect.

INDIANA

BEDFORD, IND.—Allison Engineering Co., 2100 W. 16th St., Indianapolis, plans to build a $150,000 foundry.

CROWN POINT, IND. — Northern Indiana Public Service Co., 5265 Hohman Ave., Hammond, Ind., has awarded a $175,000 contract to Fred C. Rowley & Sons, 4732 Calumet St., Hammond; Hutton & Hutton, 5231 Hohman St., Hammond, architect.

KENTUCKY

BOWLING GREEN, KY.—Derby Underwear Co. plans to build a $250,000 plant.

LOUISIANA

NEW ORLEANS—National Rice Mill has plans and specifications completed for one-story and mezzanine addition to existing building, Charters street; Leon C. Weiss, 611 Common St., architect.

MICHIGAN

LANSING, MICH.—State Journal, Grand & Lenawee Sts., has asked bids for a $1 million plant; Morton L. Pereira, 100 W. Monroe St., Chicago, architect.

MISSISSIPPI

LEXINGTON, MISS.—Board of Supervisors of Holmes county and city, Allie Povall, mayor, proposes construction of buildings to be leased to Shelby Shoe Co., Portsmouth, O.; cost $350,000.

RIPLEY, MISS.—N. W. Overstreet & Associates, Jackson, Miss., is the architect chosen to prepare plans and specifications for a shoe factory.

NEW YORK

LONG ISLAND CITY, N. Y.—McKesson & Robbins, 155 E. 44th St., New York, proposes to build a $300,000 warehouse and office at 22nd St., southwest corner of 41st Ave.; plans by Chapman, Evans & Delehanty, 50 Broadway, New York.

NEW YORK—Rhode Island Corp., 16 E. 47th St., has plans with Garrett J. Couchols, 456 Montrose Ave., Rutherford, N. J., for construction of a $300,000 fish market, 95-101 South St.

OHIO

CLEVELAND—Globe Steel Barrel Co. has been awarded an army contract of $125,180 for construction of 22,000 steel drums, beginning Sept. 1. Company plant is located at Washington Ave. & Riverbed St.

CLEVELAND—For the first time in its history, White Motor Co. will manufacture a line of trucks using diesel engines as optional equipment. Production is expected to start early in the fall. Diesel engines for the new White will be manufactured for the company by Cummings Engine Co. Inc., Columbus, Ind.

CLEVELAND—Tinnerman Products Inc., 2037 Fulton Rd., has awarded a $900,000 contract to Sam W. Emerson Co., 1836 Euclid Ave., for construction of a plant.

CONNEAUT, O.—Art Die Casting Co. has been sold by Arthur Fullerton to Fred Neuman, an employee of Art Die Casting, and Earl Ward of Chicago. The name will be changed to Conneaut Die Casting Co. and production will be continued as before with emphasis on die cast parts for hardware, plumbing and electrical supplies and parts for radio and television equipment.

SHAKER HEIGHTS, O.—Gockle Oldsmobile Co., 14307 Kinsman Rd., Cleveland, has awarded a $150,000 contract to Albert M. Higley Co., 2036 E. 22nd St., Cleveland, for construction of a sales and service building; Outcalt, Guenther & Associates, 13124 Shaker Square, Cleveland, architect.

STEUBENVILLE, O.—Nickels Bakery Inc., Martins Ferry, O., has awarded a $100,000 contract to Don M. Wyeth, 499 Third St., Washington, Pa., for construction of a bakery; C. Garey Dickson, Washington, Pa., architect.

TOLEDO, O.—Norris Grain Co., Produce Exchange Bldg., has awarded a $250,000 contract to John Naumann & Sons, 365 Parker St., and to Graver Tank & Mfg. Co., 4809 Todd St., East Chicago, Ind., for construction of facilities for grain storage; Raymond C. Reese, 300 Sandusky St., engineer.

WARREN, O.—Ohio Electric Steel Co. has been chartered through William Klee, statutory agent, 960 Fairway Dr., with 1000 shares no par common stock, for the purpose of manufacturing and dealing in iron, steel, metals, etc. Incorporators are Thomas I. Lucci, B. J. Willer and Eleanor T. Repka.

WARREN, O.—Modern Metal Products Co. has been incorporated to manufacture and deal in window screens, furnace registers, filters, appliances, etc. The firm is authorized to issue 100 shares no par common stock. Incorporators are Joseph Sarkies, Bernard Fleck and James A. Ravella, also agent, 174 N. Park Ave.

OREGON

SALEM, OREG.—State Board of Control has called bids Aug. 19 for boiler plant revision, Fairview hospital, involving four 3-drum water tube boilers, pumps, ovens, oil burning equipment, sawdust conveyor, etc.; Thomas E. Taylor, Portland, Oreg., consulting engineer.

HEPPNER, OREG. — Morrow County Grain Growers Co-operative plans to replace grain elevator and warehouses at cost of $500,000.

PENNSYLVANIA

EASTON, PA.—Dixie Cup Co. has awarded a $700,000 contract to Lauter Construction Co., 112 S. 16th St., Philadalphia, for construction of a warehouse; Carson & Carson, 16 S. Broad St., Philadelphia, engineer.

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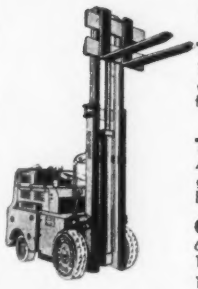

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CLARK FORK LIFT TRUCK. 6000 lbs. capacity. Battery driven. Height of lift 104", forks 38", overall height 83" **$2750**
18 Cell, 19 plate Philco Battery **$600** Additional
or 24 Cell, C8 Edison Battery .... **$696** Additional

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18 Cell, 19 plate, 495 amp. hr. Gould Battery ..... **$600** Additional
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HYSTER KARRY KRANES 5 ton capacity. 10' non-revolving boom. 40 hp Hercules gas engine. Overall width 6'4", overall length 12'8". Gross weight 11,400 lbs. EXCELLENT CONDITION ..... **$2750 ea.**

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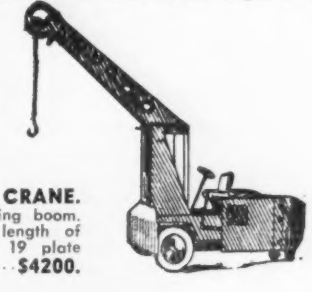

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tric Corp., Atomic Power Division, has awarded a $1,690,637 contract to Ragner Benson Inc., 4744 W. Rice St., Chicago, for construction of an administration laboratory.

TENNESSEE

ATHENS, TENN.—Hiawassee Tobacco Warehouse, c/o Chamber of Commerce, has awarded a $132,627 contract to W. E. Hamby for construction of a warehouse.

MEMPHIS, TENN. — Southern States Iron Roofing Co. has let a $100,000 contract to Tri-State Construction Co., for a sales and distribution branch; Hanker & Heyer, Commerce Title Bldg., architect.

TEXAS

AUSTIN, TEX.—Southwestern Bell Telephone Co., 308 S. Akard St., Dallas, has let a contract to J. M. Odom, P. O. Box 774, Austin, for new dial telephone building. Following are sub-contractors: Heating and ventilation, Young & Pratt, P. O. Box 901; reinforcing, Tips Engine Works, 300 Baylor; hardware, Walter Tips Co., 200 Colorado; miscellaneous iron, Southern Ornamental Iron Works, Arlington; steel sash, S. H. Pomeroy Co., New York; metal doors, Niedringhaus, Metal Products Co., St. Louis; D. W. Mier, company engineer.

BRENHAM, TEX.—Southwestern Bell Telephone Co., 308 S. Akard St., Dallas, has let a contract to B. F. Blackburn, Burton, Tex., for a telephone building.

EDCOUCH, TEX. — Southwestern Bell Telephone Co., Akard St., Dallas, has let a contract to Marchant Bros., P. O. Box 545, Mercedes, Tex., for addition to telephone building.

EDNA, TEX.—Jackson Electric Co-operative has plans for office building; Smyth & Smyth, Gulf Security Bldg., Corpus Christi, Tex., architect.

FORT WORTH, TEX.—Pure Oil Co., Humble Oil & Refining Co., Magnolia Petroleum Co., Union Oil Co., Lion Oil Co. and Pacific Western Oil Co., co-owners, have preliminary construction under way on a $6 million natural gasoline plant in South Andrews county.

HOUSTON—Felix Doran Jr., 3916 Main St., Dallas, plans to build a $250,000 warehouse No. 2; warehouse No. 3, $275,000; warehouse No. 4, $250,000.

HOUSTON—City, M. H. Westerman, city secretary, has let a $113,414 contract to Manhattan Construction Co., 2828 Pease Ave., for a third floor addition to administration building, Municipal Airport; Roy W. Leibsle, 3402 Almeda Rd., architect.

JASPER, TEX.—Southwestern Bell Telephone Co., 308 S. Akard St., Dallas, has let a contract to M. H. Thomas, Center, Tex., for a telephone building.

MIDLAND, TEX.—Pittsburgh Plate Glass Co., Thomas Jackson, Dallas, has let contract to I. C. Bateson Construction Co., 622 Irwin-Keasler Bldg., Dallas, at $118,600 for office and warehouse building, S. Main St. at S. W. Front St.; all mechanical bids rejected; Walter W. Ahlschlager, 212 St. Paul St., Dallas, architect.

NORDHEIM, TEX.—Continental Oil Co. & Associates, Ponca City, Okla., asks bids on a $1 million gas compressor plant.

REFUGIO, TEX.—Bennett Oil & Refining Co. has awarded a $100,000 contract for construction of a plant; own forces.

RIO GRANDE CITY, TEX.—Continental Oil Co., Ponca City, Okla., will build a $1,350,000 gasoline plant; own forces.

SINTON, TEX.—San Patricio Electric Co-operative has plans for office building; Smyth & Smyth, Gulf Security Bldg., Corpus Christi, Tex., architect.

UTAH

SALT LAKE CITY, UTAH—C. E. Finney Jr., president, Salt Lake Pipeline Co., subsidiary of Standard Oil Co., announces award of contracts for proposed pipe line from local refinery at Boise, Idaho. First section, Salt Lake City to Burley, Idaho, will be built by Smith Contracting Co., Fort Worth, Tex., and the Burley-Boise unit by Grafe-Callahan Construction Co., Los Angeles. Estimated cost $6 million.

SALT LAKE CITY, UTAH—Broadway Garage Inc., 50 W. Broadway, has awarded a $75,000 contract to Vincent-Peterson Co., Dooly Bldg., for a garage.

WASHINGTON

SEATTLE—Pacific Car & Foundry Co. announces a contract for rebuilding 400 refrigerator cars, 200 each, for Fruit Growers Express and Western Fruit Express. Firm is now completing 500 new refrigerator cars.

SEATTLE—Northwest Greyhound Lines has awarded $300,000 contract to E. F. Schuck for construction of shop, service and parts buildings, 1250 Denny Way.

SPOKANE, WASH.—Great Northern Railway is replacing 90-lb rail with 115-lb steel on a section of main line nearby, a $600,000 project.

WISCONSIN

CASSVILLE, WIS.—Dairyland Power Co-operative, La Crosse, Wis., has received low bid of $1,165,568 for construction of a power plant from F. H. McGraw & Co., 58 E. Washington St., Chicago.

CANADA

TORONTO, ONT. — Kop Beverages Ltd., Stewart A. Woods, vice president, 342 Douglas Ave., plans to build a $100,000 beverage plant.

TORONTO, ONT.—Parkdale Wines Ltd., 187 Bathurst St., plans to build a $500,000 factory; plans by H. B. Kohl.

MONTREAL, QUE. — Department Transport, Hunter Bldg., Ottawa, Ont., and City of Montreal plan to construct $2,408,857 tunnel under Lachine canal. Contract awarded to Atlas Construction Co. Ltd., 4787 St. Catherine St. W.

THETFORD MINES, QUE.—J. B. Gagnon, architect, 327 Notre Dame St., has asked bids for $200,000 for construction of a dry-house for Bell Asbestos Mines Ltd., 7 Notre Dame St.

PRICES OF LEADING FERROALLOY PRODUCTS

(Continued from Page 117)

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18%, and Si 53-59%). Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Deliverd. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45, (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35. F.o.b. Niagrara Falls, N. D., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract, $160 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 3-4.5%). Contract, $175 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

VANADIUM ALLOYS

Ferrovanadium: Open-Hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $2.90 per lb of contained Va. Deliverd. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.). $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.), $3.10.

Grainal: Vanadium Grainal No. 1, 93c; No. 6 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots, $1.20 per lb of contained V_2O_5, freight allowed. Spot, add 5c.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloys: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract, carload, lump, packed 20.25c per lb of alloy, ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more. 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered, spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 0.90 to 1.15%). Net ton to carload, 8c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Mn 5% max., Si 8% max., C 0.5% max.). Contract, ton lot, 2" x D, $2.90 per lb of contained Cb, less ton $2.95. Delivered. Spot, add 25c.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%, Zr 0.75-1.25%, C 3.50-5%). Carload, 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, Boron 0.55-0.75%). Carload packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, M 5-7%, Zr 5-7%, Fe 20% approx.). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.00c per lb of alloy; ton lots 18.00c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.55c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); Gross tons per carload, f.o.b. sellers' works, Mt. Pleasant, or Siglo, Tenn.; $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.10.

Technical Molybdic-Oxide: Per lb, contained Mo. f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.